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Peace Conference at Home

AS this is written, the delegates to the International Security Conference are gathering at San Francisco. The first step toward its objective of permanent peace between nations will be peace and good-will among those participating in the conference.

Without reflecting upon the scenic and other beauties of the West Coast it is difficult to understand why some six thousand miles of additional travel should be imposed upon probably 85 per cent or more of those attending, through the selection of a West Coast site. Of course, travel is said to broaden the mind, but a large dose of it sometimes shortens the temper. And good temper is a prerequisite to good-will which is the first essential for peace.

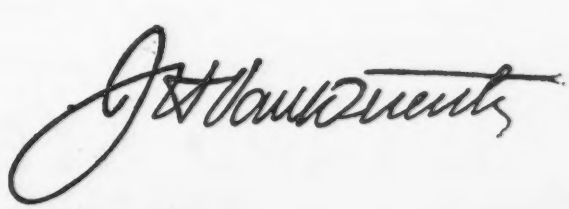
Seriously, however, the San Francisco conference is undoubtedly the most important event that has taken place in this world since the beginning of the Christian Era which was ushered in, as you remember, with the salutation: "On earth peace, good-will toward men." I hope and believe that the participants will approach their great responsibility to mankind imbued with the realization of its overwhelming importance.

Second only in importance to the establishment of peace between nations through an agreement to accept and observe certain principles of conduct is the necessity of establishing peace in America. Especially peace between those who are employed and those who employ. Unless we can look forward to approaching that objective we shall simply move from a condition of external to one of internal conflict.

The approach to internal peace is exactly similar to that for external. First, there must be a desire for it and a recognition of its necessity. I believe that this desire and recognition exist among 90 per cent of employers and employed.

Second, there must be a meeting of minds concerning fundamentals or principles of conduct. Eric Johnston of the U. S. Chamber of Commerce, and the top labor leaders of both the AFL and CIO have already gone a long way toward taking that important step.

Only an idealist, of course, would believe that either external or internal agreements on principles of conduct would immediately or completely eliminate friction between nations or individuals caused by conflicting interests. But only a bull-headed employer or labor leader would hold that the encouragement of unnecessary strife through a refusal to agree on anything at all would open the door to either a better world or a better America.



Millions are "*Injured*" by a Single Accident

Not so many months have passed since an accident meant little more than some personal loss and a temporary, but easily adjusted, work schedule. Today, that situation is completely changed.

Every accident of the 9,000,000 that occur annually is a national liability, affecting, not only the output of the injured worker's shop, but also the production of other shops. Yes, a single accident "injures" millions —millions of other workers who are trying desperately to reach maximum war output—millions of American citizens who are striving to retain their freedom—millions of American fighting men who never can have all the equipment and supplies they need for Victory so long as America is careless on the home front.

Anything you can do to prevent accidents will be a real contribution to America's fight for freedom. Remove hazards at home, drive carefully, be considerate of others in traffic, observe safety rules when at work, promote safety and safety programs no matter what your position may be.

Start today! Think safety, promote safety! Keep more war workers on the job for Victory!

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The IRON AGE
May 1, 1945

NEWS FRONT

► Specifications are said to be drawn up for the construction of a $3,500,000 machine tool plant to be built in China after the war. Current reports are that the Giddings & Lewis Machine Tool Co. is drawing up the plans and specifications.

► General Motors has been authorized to proceed with a $1,264,000 project for restoration of its Southgate Los Angeles plant for assembly and finishing, to be ready when the automobile go-ahead is given. The plant saw both tank and aircraft production during the war.

► Ford will build an $800,000 parts depot in Seattle to serve outlets in Washington and parts of Idaho and Oregon. The project is part of the company's $150,000,000 postwar expansion program.

► Despite the magnitude of estimated Army transportation requirements to the west coast no embargo on civilian shipments is in prospect in the near future.

► Bethlehem plans revamping of its structural mill at Lackawanna at a cost of $15,000,000 to $20,000,000. The move is being used in Buffalo as a weapon against the proposed St. Lawrence Seaway project.

► Relaxation of wartime controls in Canada is being reversed, following trends in this country. Steel, magnesium, and aluminum restrictions had all been lifted prior to the present policy reversal.

► Effects of the cancellation of the B-24 Liberator production are being felt in production centers, as B-29 schedules are not being accelerated, although they have not yet reached their peak. B-32 Dominator schedules are being accelerated to a limited degree.

In general, there are sufficient new aircraft contracts available for companies who wish to stay in the aircraft business. Major automotive firms are being moderately successful in getting out of aircraft work, even of as critical importance as the B-29 program.

► The auto industry does not expect its reconversion problems to include that of steel supplies. Belief is now being expressed that somewhere more than 3,000,000 tons of steel will be available in the first quarter after VE-Day. Of this, the industry is expected to be allocated sufficient to start out on production, and subsequent stocks will be enough to meet requirements.

No stainless steel is expected for the immediate future period, but the car makers have been told that they will be able to go to the use of full alloy steels where they desire them for engine parts, rather than the lean alloy NE grades. This switch is expected as of VE-Day.

Likely most specifications will return to the SAE standards, although a few NE series, like the 8600 to 8700 group, have been satisfactory enough to many users during the war period that they will probably continue in demand.

► WPB has restored the spot authorization plan to full operation as part of the board's adjustment to reduced military demands.

Overall munitions cutbacks of 12 to 15 per cent are expected to be made within the next few weeks.

► Supreme Court's ruling that the single basing point system is illegal will probably set off a price upheaval. FTC, long an opponent of the basing point system, is likely to renew its blows at the multiple basing point pricing system.

► Economic Stabilizer William H. Davis in his new directive giving the board discretionary authority of passage on fringe wage adjustments has finally been able to put through a policy he urged as head of WLB but which had been turned down by Fred M. Vinson.

The new standards are considerably more flexible than Vinson's directive of March 8 which fixed rigid standards in such adjustments. Shift differentials of 4c an hr. for the second shift and 6c an hr. for the third shift may be awarded by WLB in continuous industries as well as vacation periods if such a practice is common for the area or industry.

Resin Coatings

Baked by Induction Heating

. . . Baked phenolic coatings on pipe have demonstrated great resistance to corrosion in use. The application of induction heating to the continuous baking of resin coated pipe shows commercial practicability and many advantages over conventional baking methods. Other uses of induction heating for the curing of resin coatings on metal are discussed.

By A. P. MAZZUCCHELLI
and
R. E. NICOLSON
Chemical Engineers, Research Laboratories, Bakelite Corp., New York

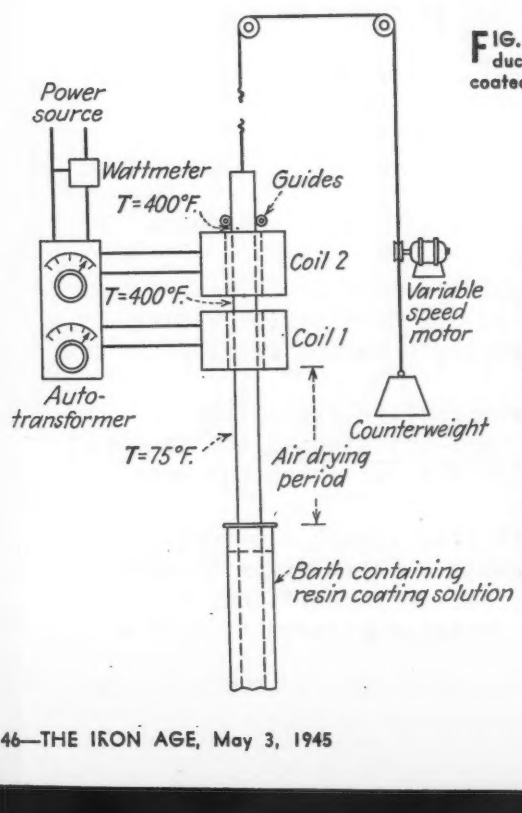
o o o

THE use of phenolic resin baking finishes for the protection of metallic surfaces against corrosion is helping solve one of industry's major problems. These baking finishes are thermosetting phenolic resin solutions, which upon application and baking, form insoluble, infusible, dense, glasslike organic coatings. First brought out some 30 years ago for the protection of brass beds against tarnish, these coatings today are finding extensive use in prevention of corrosion of all types of equipment and products ranging from costume jewelry to tank cars and machinery.

During the current critical shortage of corrosion-resistant metals and alloys, the use of substitute metals with baked phenolic resin coatings has proved highly satisfactory. In many cases these organic finishes have withstood corrosion better than the various metallic or ceramic materials used in the past. The properties of these baked finishes which have made them so successful are excellent resistance to mineral acids, organic acids, organic solvents, and most inorganic compounds, along with good electrical insulating properties, good abrasion resistance, and thermal resistance up to 400 deg. F.

During the past few years intensive studies have been made of corrosion-resistant coatings for buried pipe by both the Bureau of Standards[1] and by private companies. Sections of pipe were buried for 4 to 6 years in various types of corrosive soils, dug up at the appointed time and examined for corrosion. Pipes that had received a phenolic resin baking coating withstood all the tests. Various corrosion-resistant steels, zinc, zinc-coated copper, cast iron, etc., that were included

[1] *U. S. Department of Commerce, National Bureau of Standards, Research Paper R. P. 1446, January, 1942.*



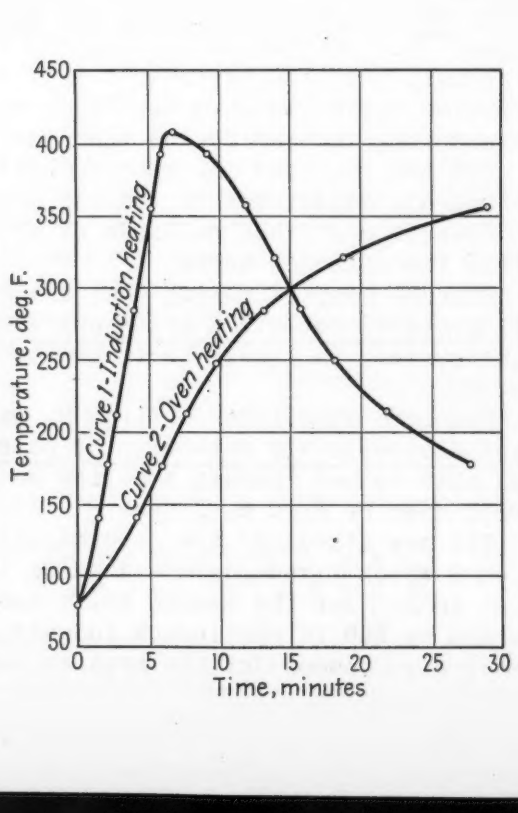
LEFT

FIG. 1—Continuous induction-baking of resin-coated pipe.

o o o

RIGHT

FIG. 2 — Heating rates for a resin-coated pipe. Standard 1½-in. iron pipe, B.V. 1600 resin baking coating. Curve 1, continuous induction - heating. Pipe exposed to magnetic field for 6 min.; power input of 400 watts. Curve 2 oven heating. Ventilated oven temperature, 395 deg. F.



were corroded—some having holes an inch or more in diameter. The specimens treated with resin baking film, however, were in perfect condition.

In another test, boiler tubes coated with resin baking varnishes were subjected to boiling water at 212 deg. F. on the outside and heat of radiation at 675 deg. F. in the inside. After 3 years of service the coatings were unaffected; in fact, the inside coating was improved in appearance, having become denser and smoother.

As a result of these tests and the demands of the Navy for a pipe resistant to the corrosive action of salt water, manufacturers have evinced considerable interest in an economical method for continuously coating pipe, internally and externally, both in the factory and in the field. Oven baking is being actively considered, but preliminary considerations indicate that it is costly.

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RIGHT
PIPE in resin bath.

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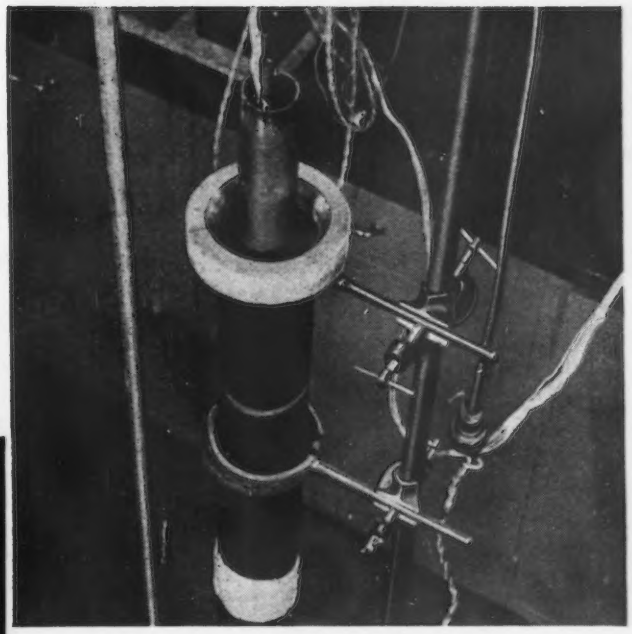

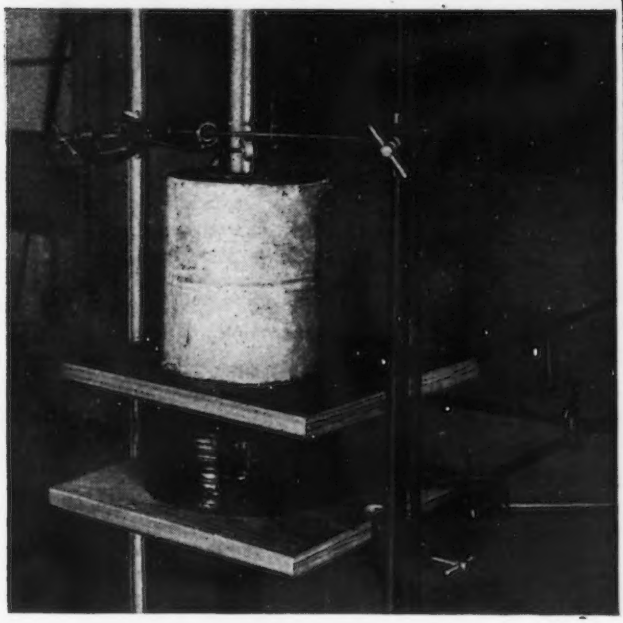

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COATED pipe passing through heating coils.

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The recommended baking times for conventional baking methods range from 20 to 60 min. at 275 deg. to 400 deg. F. The common sources of heat which are being used commercially are (a) electrically heated circulating air ovens, (b) gas-fired circulating air ovens, (c) infra-red baking units, and (d) a combination of the regular gas-fired convection-type oven, and infra-red baking.

All of the above sources of heat depend upon convection or radiation to transfer heat to the mass being baked. In all cases heat is forced from the outside, through the resin film to the surface of the coated piece. The outer film is cured first and that next to the pipe last. The time to bring the object up to the polymerization temperature represents a large part of the total baking cycle. Furthermore, the above baking methods do not readily lend themselves to continuous operation.

The application of a baked resin finish to a metallic surface involves the following steps:

(a) **Surface preparation, such as sandblasting or etching to improve adhesion between the baked resin film and the material being coated.**

(b) **Application of the resin solution to the object by means of spray coating, slush coating, dip coating, roller coating, or brush coating.**

(c) **A 10-min. or more air-drying period immediately after the coating has been applied.**

(d) **A baking cycle to further polymerize the resin and to produce an infusible and insoluble, glasslike film.**

Use of Induction Heating

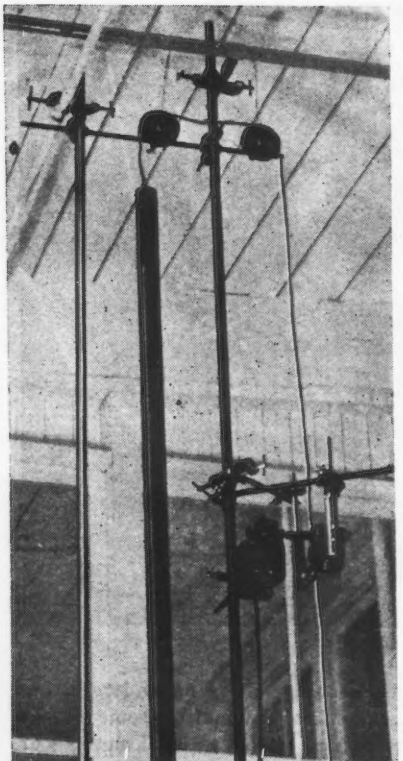
The curing of resin coatings on metal by an electrical method—induction heating—offers many interesting possibilities, eliminating some of the limitations of conventional methods of baking coatings. This method has been applied to the continuous coating and curing of thermosetting phenolic resin on pipe and it offers considerable promise. The process involves continuously passing the pipe through a tank of the coating solution and then through an electromagnetic field actuated by low-frequency alternating current. The pipe is almost instantly brought to the desired temperature, and the coating is cured within several minutes, depending on the reactivity and heat resistance of the coating and the power applied.

Mathematical formulas for heating rates and power absorbed are complex and frequently of little use in practical problems. They do serve, however, to show the relationship between the various factors involved.

$$P = KI^2N^2p^{1/2}u^{1/2}f^{1/2}$$

where P = power dissipated as eddy currents
K = a constant
I = current flowing in the primary coil
N = effective number of turns in the primary coil
p = resistivity of the load
u = permeability of the load
f = magnetic field frequency

For induction heating applications requiring frequencies up to 10,000 cycles per sec., power is generated almost entirely by motor-generator sets. This range of frequency is satisfactory for almost all induction heating applications except for surface hardening and the rapid heating of very



VIEW of hoisting mechanism, showing coated pipe section leaving the heating coils.

o o o

small parts. The latter applications require high frequencies which can be best supplied by a vacuum tube oscillator. Where lower frequencies can be used, however, generator sets are more economical than vacuum tube oscillators, because of their lower equipment and maintenance costs.

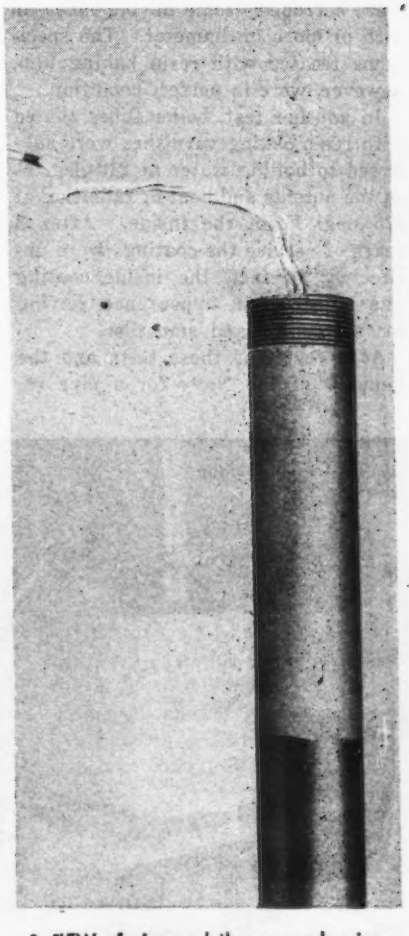
Continuous Pipe Coating

The application of resin baking coatings to iron pipe (as has been mentioned) is a problem of current interest. The use of ordinary ovens for baking the coatings is a slow process which requires a huge oven capacity and much handling of the pipe. In the use of induction heating for baking, the apparatus can be made relatively small and simple, and the operation may be one which readily lends itself to a continuous baking process.

As such a setup would provide interesting data, bringing out the advantages and limitations of induction heating for the curing of coatings, a small continuous pipe coating unit was installed in the laboratory. A schematic diagram of the apparatus is given in Fig. 1. Since iron was the metal selected for the tests it was decided to use the most readily available source of alternating electrical power —namely, an ordinary 60 cycle per sec. 220 volt line.

A preliminary investigation was made using a 550 turn coil, 7 in. high, having an internal diameter of 3 in., and a length of standard 1½-in. iron pipe. Thermocouples were peined in the pipe at inch intervals to provide accurate temperature control. The 220-volt, 60-cycle line to the coil was metered for volts, amperes, and watts. The pipe was suspended within the coil, kept stationary, and data obtained on power-time-temperature relationships. From curves of these data it was possible to select the proper power input to raise the pipe to a given temperature in a given time, and the required power input to keep the pipe at this temperature during the cycle.

For continuous operation, two 550 turn coils were used to supply energy to the pipe. The pipe was raised to the curing temperature while in the field of the first coil and held at that temperature while in the field of the second coil. A variable speed hoisting mechanism was used to draw a 5-ft. length of standard 1½-in. iron pipe from a resin coating tank through the heating coils. The thickness of the resin film could be con-



VIEW of pipe and thermocouple wires, showing the contrast between the untreated (top) and the resin-coated pipe.

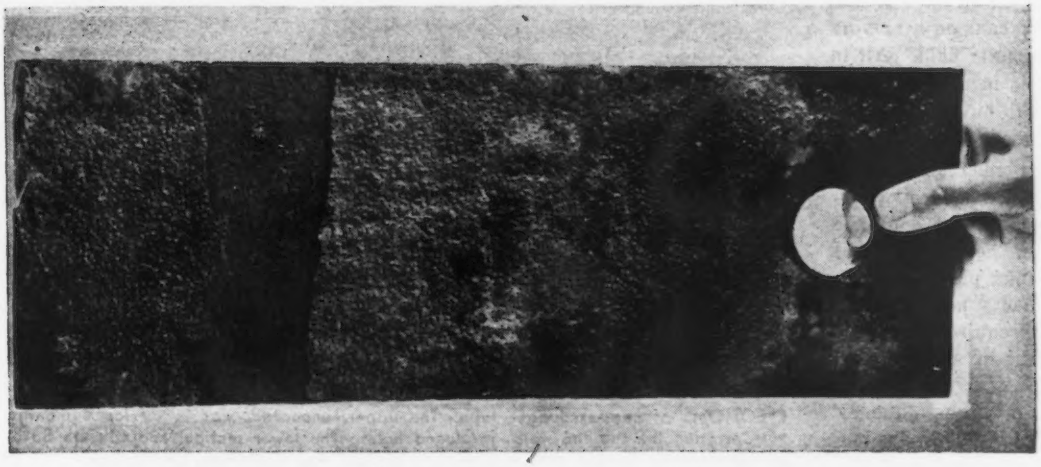
o o o

TABLE I

Data on Continuous Pipe Coating

Property	RUN 1	2	3	4	5
Type of coating	BV-1600 Ethyl alcohol	BV-1600 Ethyl alcohol	BV-1600 Ethyl alcohol	BV-1600 Ethyl alcohol	BV-1600 Ethyl alcohol
Viscosity of coating solution, KV	90	100	165	330	165
Type of pipe, standard iron	1½ in.	1½ in.	1½ in.	1½ in.	1½ in.
Rate of travel of pipe, in. per min.	2½	4	4	3	3
Power input-coil 1, watts	250	490	490	400	440
Power input-coil 2, watts	140	200	200	180	200
Curing temperature, deg. F.	410	375	375	410	390
Time in magnetic fields, min.	6	4	4	5	5
Film thickness-mils	0.4 to 0.6	1.0	0.8 to 1.0	1.0	0.75
Remarks	Excellent coating, free from defects	Good coating except at end of pipe	Good coating, free from defects	Film badly sagged and blistered; coating solution too viscous	Excellent coating, free from defects

$$\text{Efficiency} = \frac{\text{Energy to heat pipe to curing temperature}}{\text{Energy input to coils}} = 85 \text{ per cent}$$



LEFT

THIS panel was coated on one side with Bakelite's resin baking system, then subjected alternately for one week to gasoline, hot sea water, and moist air. Then this cycle was repeated each week for 2 years. The uncoated side of the panel is shown here after the 2 years.

trolled by the viscosity of the solution used, or by the rate of withdrawal of the pipe. A suitable space was left between the surface of the resin solution and the heating coils to allow for drainage and proper air drying. A standard phenolic resin baking coating, Bakelite resin baking varnish BV-1600, diluted with ethyl alcohol to the desired viscosity, was used for the tests.

Using this induction heating technique, resin baking films were formed on both the inside and outside surfaces of the iron pipe that were fully equivalent to those obtained by standard oven curing. In general, the resin-coated pipe was raised from room temperature to 375 deg. to 400 deg. F. in 2 min. by the lower coil, held at this temperature for 3 min. by the upper coil, and then allowed to cool to room temperature. The pipe emerged from the second coil with a hard cured coating, which was further cured as it gradually cooled to room temperature. A summary of pertinent data for several runs is given in Table I.

In many applications of resin baking finishes, especially where the corrosion problem is severe, the use of multiple coats has many obvious advantages over a single coat job. The application of multiple coats, however, involves the problem of not overbaking the undercoats in order to provide good fusion between the coats, especially if four or five baking schedules are required. The excellent temperature control possible with induction heating makes this method very applicable to the baking of multiple coatings. Any degree of cure for a given coat can be obtained by either regulation of the power input or the rate of travel of the work. Actual laboratory runs have been made in which multiple coatings on pipe have been very satisfactorily applied.

The advantages of induction heating for the curing of resin coatings on pipe may be summarized as follows:

(a) The rate of heating to carry temperature can be made as rapid as desired, and this, as well as the temperature of curing, is limited only by the properties of the coating employed. This decreases cure time as compared with a corresponding oven-baking operation. (See Fig. 2.)

(b) The time at curing temperature is a function of the length of the heating coil and the rate of travel of the pipe.

(c) Excellent temperature control is possible.

(d) The heat is generated within the pipe and the resin is cured from the surface of the pipe outward. (In oven heating the outer film surface is cured first, and that next to the pipe last. This results in a cured outer film through which the remaining solvent must be forced in order to effect full cure.) This should allow the use of higher baking temperature and permit the making of thicker blister-free coatings.

(e) Either thermosetting or thermoplastic coating solutions may be used.

(f) The operations of dipping, withdrawal, air drying and curing require only one handling operation. Known methods of spray coating could also be applied.

(g) Equipment cost for many applications would be low as compared to the cost of large baking ovens. Induction heating offers an excellent means for a continuous baking operation which would be of great advantage in many cases. It is possible that a multiple number of pipes in a bundle could be passed through a single coil at one time and heated uniformly.

(h) Heating efficiencies, based on heat required to bring the metal up to temperature, divided by the energy input to the coil, averaged 85 per cent for the experimental unit. Based on 1c. per kw-hr., 1 ton of pipe could be treated at a power cost of 28c.; in other words 42 ft. of 1-in. pipe, 26 ft. of 1½-in. pipe, or 19 ft. of 2-in. pipe (standard iron) could be coated for a power cost 1c.

ABOVE

THIS is the same panel as that at the left, showing the side coated with Bakelite resin finish. It retains its original gloss, and the steel plate underneath has not been attacked.

Other Coating Applications

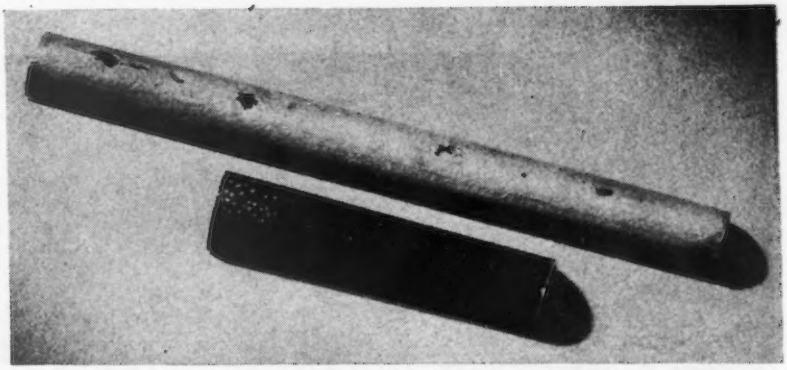
The work done on induction baking of resin film on pipe indicates that this method is practical and will give results fully equivalent to other methods of baking. The method, however, is not limited to this one application, but could be applied to any number of metal items having baked resin coatings. For example, the metal sheets used to make tin cans, and other metal receptacles, are now resin-coated prior to forming, then oven baked and formed. This involves special techniques in the application of the resin so as not to coat sections that must later be soldered. The cans are not first formed and soldered, and then baked, because the oven capacity required would be impractical. Using induction baking, however, it would be possible to form and solder the metal sheet, coat the finished can with resin baking solution, then effect the

cure by passing the cans on a moving belt through a magnetic field. All in all this would result in a simpler operation which would have the added advantage of being continuous.

Another problem in resin baking finishes for pipes is the need for portable baking equipment that could be used in the field. In the experimental work on pipe coatings previously described, a low-frequency power source was utilized, which required a coil of several hundred turns in order to supply the required flux at a practical amperage. With a high-frequency power source—500 to 10,000 cycles per sec.—a coil of relatively few turns would be required. It would be possible, therefore, to make simple jigs and coils, and, with the aid of a portable power supply, to do the resin baking in the field.

The baking of coatings on the inside of pipes would be especially easy, for, after the application of the resin solution, a coil could be wound about the outside of the pipe using insulated flexible cable, and the power applied. For pipes coated on the outside, the general method would be the same except for the addition of an insert nonmetallic form to support the coil and to prevent it from touching the varnish coating. This type of equipment would also find use in the patching of coatings marred in assembly.

Looking further into the future, it may be possible to cure baking finishes on metallic surfaces of flat or irregular contours by focusing a source of inductive heat from a high-frequency current source on a limited area of the object to be treated.[1] This type of baking involves the use of high-frequency power—10,000 to 50,000 cycles per sec. or higher. A primary coil is held near the coated metal surface, thereby inducing sufficient current flow within the metal to effect baking of the coating. With proper conditions the rate of heating of the metal object could be made far greater than that obtained with baking ovens or infra-red baking.



SECTIONS of heat-exchanger tube. The upper, uncoated, was in service 4 months. Corrosion thinned the walls, produced holes. The lower section, coated with Bakelite resin baking finishes, was in service 11 months, was practically unaffected.

[1] *U. S. Patent 2,267,001, Toulmin, Harry A., Jr., 1941.*

A New Graphitizer for Cast Iron

A NEW graphitizing inoculant for ladle additions to cast iron has been developed by the Vanadium Corp. of America and is being marketed as Graphidox No. 4. The alloy, containing 45 to 50 per cent silicon, 9 to 11 per cent titanium and 5 to 8 per cent calcium, is said to be several times as effective as ferrosilicon in chill reduction, Fig. 1, for low carbon-equivalent irons. This inoculant* also serves to deoxidize the melt and improve the strength of castings (See Fig. 2), by breaking up weak dendritic microstructures. In addition to the alloying effect of the inoculant in promoting the strength of castings, Graphidox No. 4 is said to be helpful in developing maximum benefits from alloy additions to cast iron. Because it contains a large percentage of silicon, the amount of silicon required by alloying can be reduced in the proportions shown in Fig. 3.

*See "Inoculants in Gray Iron," by Rebecca Hall Smith, THE IRON AGE, March 15, 1945, p. 58.

FIG. 1—Comparison of the chill reduction effectiveness of ferrosilicon and Graphidox on cast iron containing 3.25 per cent total carbon, 2.00 per cent silicon. Test data from a chill block 5/16 in. wide at base.

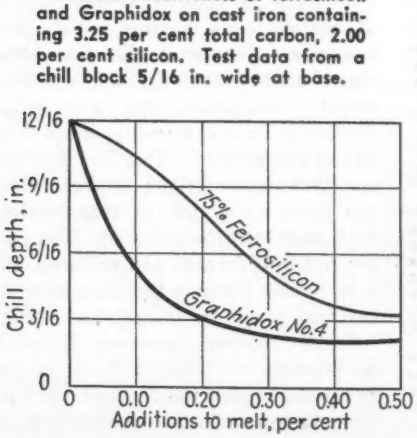


FIG. 2—Effect of Graphidox on tensile strength of cast iron.

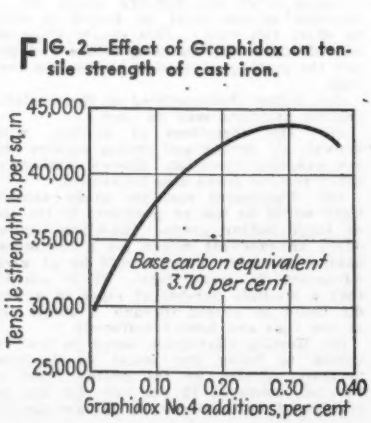
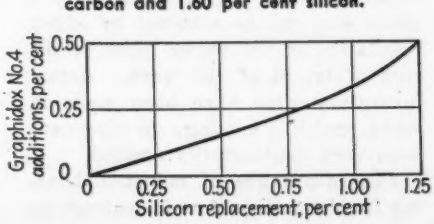


FIG. 3—Recommended silicon reductions for corresponding Graphidox additions in a cast iron containing approximately 3.15 per cent total carbon and 1.60 per cent silicon.



Increasing the Life And Accuracy Of Lamination Dies

By GUY M. SHINGLEDECKER

Superintendent, Laminations Division, Allegheny Ludlum Steel Corp.

. . . Experience gained in the production of electrical steel laminations at Allegheny Ludlum Steel Corp. has aided in the development of dies of long and accurate life, in the selection of suitable steels and in blanking practices.

SUCCESSFUL production of electrical steel laminations has two primary requisites from the user's standpoint. These are magnetic performance and accuracy in dimensions. From the standpoint of the producer of laminations, there are two other factors in addition to those necessary to satisfy the user. These are minimum scrap loss and long die life. Due to the high cost of die production, die life is not only a major consideration, but also, due to uncertainty, is a variable factor in estimating costs for any type of production requiring large numbers of laminations.

While the Allegheny Ludlum Steel Corp., is primarily a manufacturer of specialized steels, it is in an unusual position to study the factors mentioned since it happens to be the only organization which makes laminations from electrical sheet and strip produced in its own plant with dies which it makes from its own tool steel. It has a well equipped punch and die making shop.

No single factor provides the key for the ideal production of laminations. The right steel with the correct electrical characteristics and stamping qualities is essential of course, but the quality of the steel is not the answer to the entire problem. In 90 per cent of the applications correct annealing of the laminations after stamping is essential in order to obtain the desired electrical characteristics. Correct and carefully controlled annealing often saves the user money by permitting the use of lower cost steels than otherwise would be necessary.

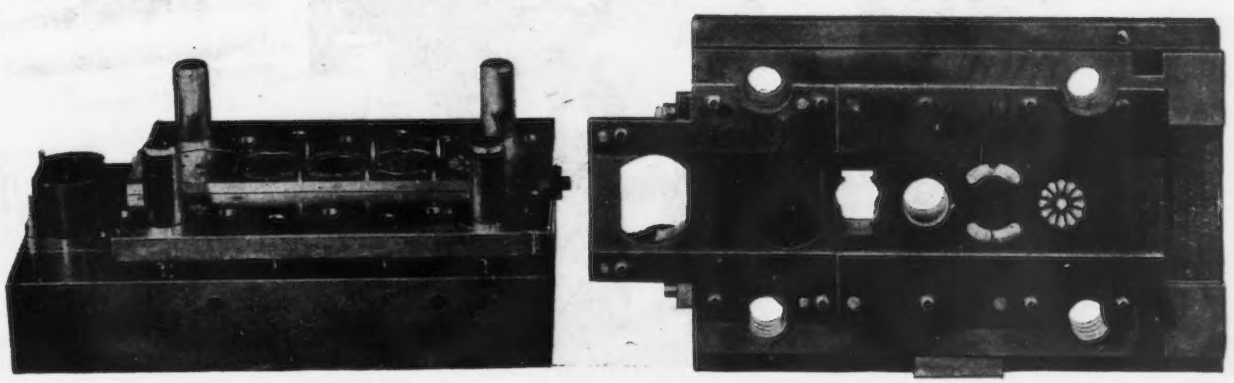
While electrical steels are sold on the basis of maximum core loss guarantees, as determined by standard Epstein tests, these tests do not tell the full story about the performance of laminations when actually put into motors, generators or transformers. The original electrical qualities of the steels are affected by the stamping operations as well as by annealing subsequent to the stamping. The state of compression into which the laminations are assembled in the finished equipment and the final state of the oxide insulating coating on the laminations also are variable factors. The end result in actual performance can be determined only by properly conducted tests of the finished stampings under conditions identical to actual use.

Steel Selection

The first step in the production of any set of laminations is the selection of the steel. This involves deciding not only upon a material which, after annealing, will have the desired electrical characteristics, but also on the steel that will have satisfactory stamping qualities for economical production.

Electrical steels are available both in sheets and coiled stock. Convenience in handling gives coiled stock a definite advantage when it is fed to high speed automatic presses. Because of the differences in methods of

FIG. 1—The complex structure of a typical sectional four-stage progressive laminations die used by Allegheny Ludlum Steel Corp. for operation in high speed automatic presses. While sectional construction of dies calls for exacting workmanship, it adds to die life and maintenance of production by permitting quick replacement of parts in case of failure.



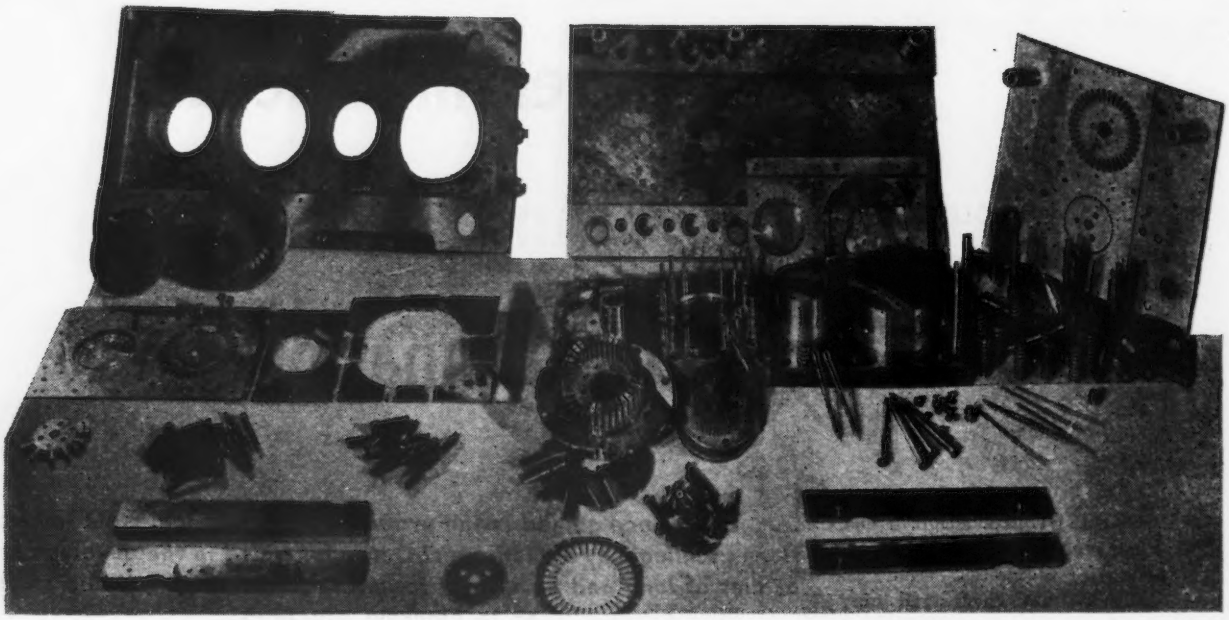


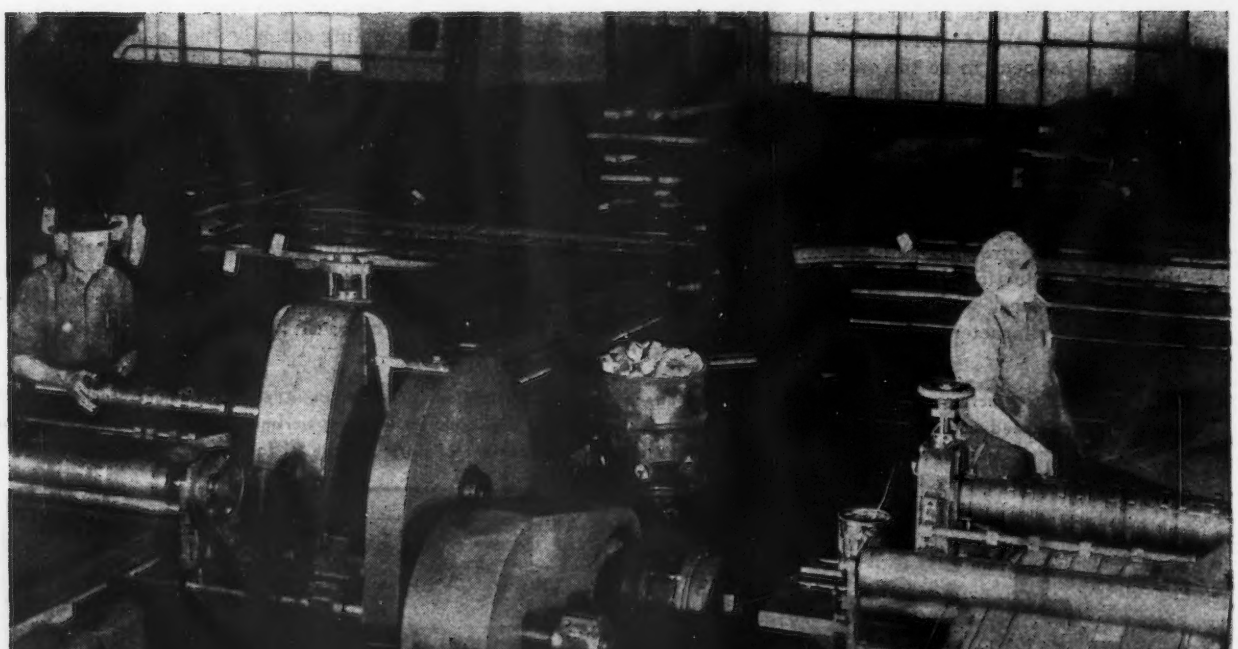
Fig. 2—The die shown in Fig. 1 is shown here broken down into all of its components.

rolling, however, sheets and coiled stock of the same analysis have different magnetic and physical characteristics.

In general, coiled stock has superior qualities to sheets when the path of the magnetic flux in the finished transformer laminations is in the direction of rolling, and poorer characteristics than sheets when the path of the magnetic flux is across the direction of rolling, that is, across the strip. This makes coiled stock ideal for wound cores but it is at a disadvantage in transformer laminations where a large part of the path of the flux is across the direction of rolling.

On the other hand, laminations made from coiled stock have a better stacking factor. Coiled stock has a

FIG. 3—Slitting accuracy guaranteed within 0.005 in. is necessary in fabricating scrapless laminations, where the width of the strip is the width of the laminations. This rotary shear is slitting electrical sheets to widths required for the scrapless "E" and "I" transformer laminations.



smooth flat surface which makes it possible for a fabricator to stack a little more into a given space. These opposing factors must be taken into consideration in selecting the types of steel.

Punch Clearances Critical

The selection of a good tool steel and the proper design of a die are the next essential steps in the team necessary for ideal lamination production. Since minimum burr height, as well as accuracy in dimensions, is essential to the user, great care must be exercised in the determination of clearances between punches and dies. A slight variation in thickness or hardness of material being used can make material satisfactorily workable or unworkable with a given die clearance. Once the type of material has been selected, this condition makes it essential that punches and dies be made within close tolerances in order to produce stampings with a minimum burr and thus reduce rejections. An accuracy of plus or minus 0.0001 in. is the tolerance used on most types of dies as made in the Allegheny Ludlum shop.

Clearances on each side of punches are recommended for various types of electrical steel, as shown in the accompanying table.

For lowest die costs per pound of finished laminations, it has been found desirable to maintain the following burr inspection limits as a basis of the best die grinding practice:

Gage No.	Burr Limit, In.
29	0.002
26	0.0025
24	0.003
22	0.0035

This procedure will result in less die steel removal per grind and the longest possible die life, while producing the highest quality of magnetic core laminations.

The great loss involved in the breaking of a solid die has been responsible for the adoption of the practice of using dies built up in sections. The complex geometry of some of the parts to be fabricated also makes it necessary that some dies be built in sections in order to facilitate grinding.

Sectional Dies

Under the system of using sectional dies, any breakage is localized and may be repaired by the insertion of a new section without the necessity of making an entirely new die. Spare parts for extremely complex sections can be made in advance and stocked so that the damage to a die can be repaired in a minimum of time. The building of such dies obviously is costly, but the savings resulting from the ability to repair damaged dies makes the initial cost worth while. A typical sectional four-stage progressive die for stamping laminations is shown in Fig. 1, and the many parts going into this die are shown in Fig. 2.

The production of sectional dies requires a tool department with fine equipment and with toolmakers trained to work to extremely close tolerances. The close tolerances necessary to produce parts sufficiently exact cannot be achieved by ordinary grinding equipment. The practice in the toolroom of the Allegheny Ludlum die shop is to buy the best equipment available and in most cases recondition the machine before putting it into operation. This rebuilding involves painstaking hand scraping of ways and special fitting of all bearings to a degree of accuracy necessary to turn out work with tolerances of plus or minus 0.0001 in. In addition to the usual gages and instruments, optical comparators are required giving a magnification of 50 to 1 in order to check complex die contours. Most of the grinding machines are provided with

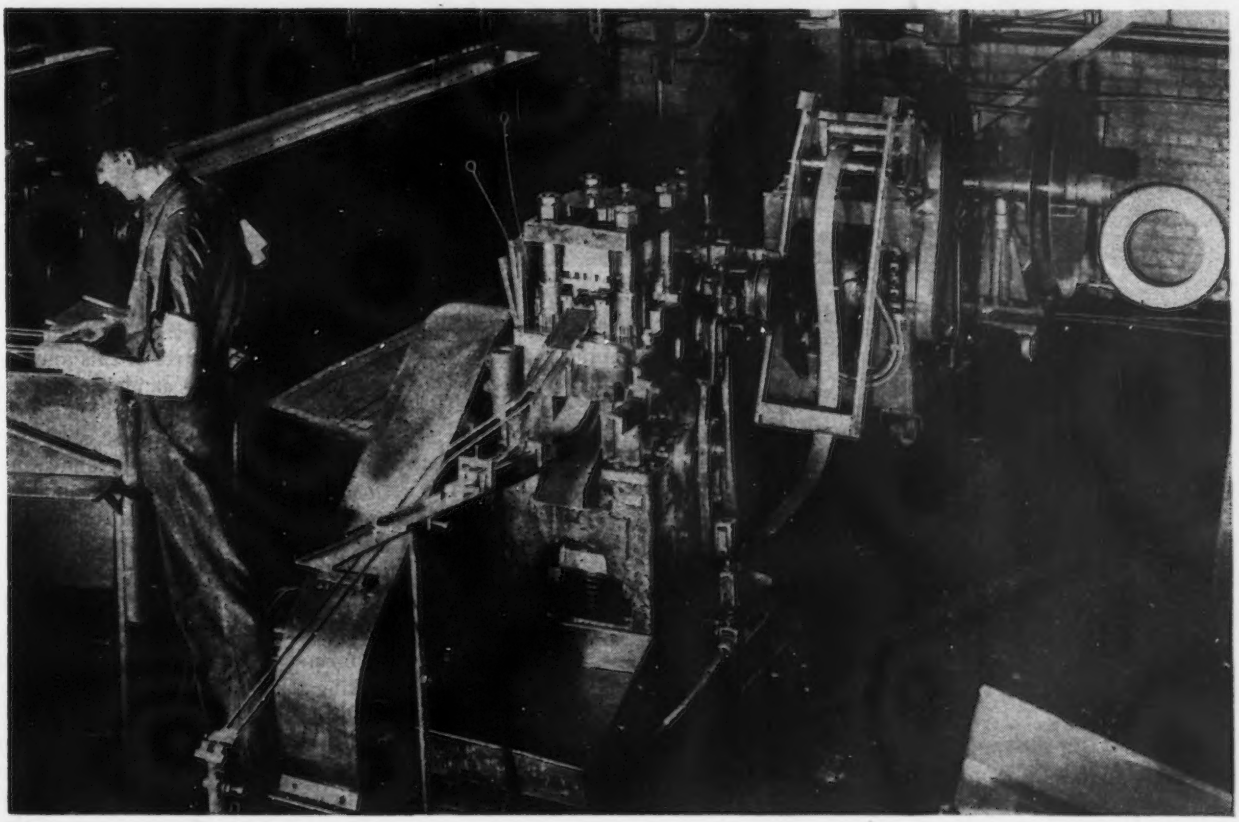


FIG. 4—This standard 25-ton press is used in producing the "E" and "I" type transformer laminations from alloy coils. The die is the sectional progressive type, using Huron die steel on all cutting edges. This die steel is hardened to 62-64 Rockwell C to resist wear.

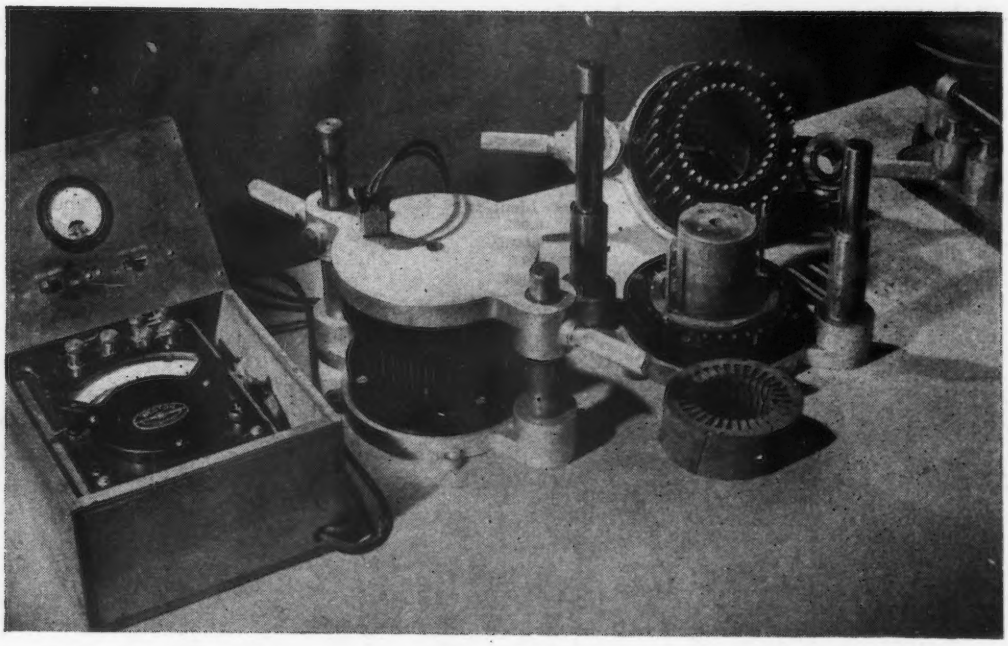


FIG. 5—Apparatus developed by Allegheny Ludlum for measuring core loss and exciting current in testing stator laminations.

magnetic chucks, and magnetic jigs are used for positioning parts which must be ground to special angles.

Since the best die punching a steel with ideal stamping qualities can be ruined on a defective press, special care must be given to press room equipment. Allegheny Ludlum follows a practice in relation to its presses similar to that on its grinding equipment. When a new press is bought, it usually is torn down and rebuilt. Some parts are chromium plated to minimize wear and all bearings are specially fitted to insure accuracy and long life.

A systematic program of inspection and maintenance is followed on all press equipment. This keeps a crew of maintenance men constantly busy checking and repairing the presses.

Progressive Dies

Progressive dies are used for most jobs. These dies consist of a number of stations where such punching operations as piercing, slotting and blanking are performed in sequence. In the case of a typical rotor and stator die, the sequence is as follows: Pierce rotor, blank rotor, trim air gap, slot stator and blank stator. This type of die produces laminations suitable for automatic stacking and perfect alinement from the press, thus saving labor and money in comparison to the compound method.

One interesting operation is the production of "no scrap" transformer laminations. These consist of "E" and "I" shapes. They are designed to obtain both maximum material economy and electrical performance. The only loss in the material is due to the holes, and the best electrical performance is obtained by having most of the section in the direction of rolling.

Following close tolerance slitting, as shown in Fig. 3, the holes are punched from the strip at the first station. The "I" pieces are then blanked out, forming the windows of the "E" pieces. The "E" pieces are then blanked. Two "E" and two "I" pieces are produced with each stroke of the press, shown in Fig. 4. It is pertinent to note that the economy in material is affected by making the length of the "I" pieces twice the length of the "E" windows.

After punching, the laminations are inspected, and stacked and are then wired together preparatory to annealing. Annealing of most types of steel is performed in electric furnaces under controlled atmospheres. Proper temperature recording equipment is essential for correct annealing.

The annealing of highly permeable nickel alloys is conducted under dry hydrogen at high temperatures with a suitable inert material between the laminations to keep them from fusing. Equipment and control of this annealing process are so complex and delicate that the company recommends that users of this type of steel for stamping do not attempt annealing themselves, but return the laminations to Allegheny Ludlum for annealing.

The department has extensive facilities for testing stacks of laminations in order to determine the magnetic performance of the core material. In making tests, the laminations are assembled into finished cores and are placed in windings similar to those used in the final assembly, so as to duplicate as nearly as possible the conditions of actual use. Some of the testing apparatus used in inspecting these items are shown in Fig. 5.

The result of the policy of accuracy and control throughout the entire process has permitted the organization to achieve not only some outstanding individual records in the life of

(*Continued on page* 135)

Punch Clearances Recommended for Various Electric Steel Grades

Grade of Steel	Clearance Recommended, In.			
	29 Gage	26 Gage	24 Gage	22 Gage
Transformer grades	0.0007	0.00085	0.001	.....
Dynamo special	0.0007	0.00085	0.001	.....
Dynamo	0.0006	0.00075	0.0009	.....
Electrical	0.0005	0.00075	0.0009	0.0015
Armature	0.0005	0.00065	0.0008	0.0015

Navy Cutting Torch Pack Weighs 56 Lb.

A NEW oxy-acetylene emergency cutting outfit for use under battle damage conditions weighs only 56 lb. in its fire resistant canvas back pack and compares with earlier equipment weighing almost 200 lb. that requires at least two crewmen to man handle it.

The new unit consists of two 22 cu. ft. capacity oxygen cylinders and one 10 cu. ft. acetylene cylinder, gas regulators, a hand cutting torch, hose, asbestos gloves, lighter, goggles and tools. Oxygen cylinders are connected by a manifold and regulators are designed to control automatically the supply of gases to the cutting torch. All the operator must do before using the unit is to open valves of the cylinders.

In cases where battle damage has caused the jamming of compartment doors or where twisted steel wreckage needs cutting away prior to repair work, a single operator with his portable cutting gear can cut his way into damaged spaces, making way for fire hoses and repair parties. Men trapped in compartments have been quickly rescued by immediate use of the equipment, and fires have been reached and controlled that might have caused severe damage.

Rapid replacement of gas cylinders is accomplished by arranging all three cylinders in units, with an oxygen manifold already attached to the cylinder valve outlets and the cylinder set clamped in an aluminum cradle. A change of cylinders is accomplished by detaching the gas regulators from the cylinders, removing the empty set from the pack, replacing with a fully charged set and reattaching regulators. The gas capacity of one set or unit of cylinders will cut approximately 225 lineal inches of 1 in. steel plate.

The probability that the new emergency cutting outfit will be used by relatively untrained operators under battle damage conditions necessitated the development of special pre-set gas regulators to assure adequate flow of oxygen and acetylene at the torch. The gas regulators are small and of compact design to reduce the overall dimension and weight of the complete outfit. Specifications developed by the Bureau of Ships required suppliers to produce pre-set pressure, 2-stage oxygen regulators and similar single stage acetylene regulators. Service tests assured safe and economical delivery of gases under the most critical battle damage conditions regardless of an operators' nervousness or inexperience.

o o o

CUTTING away ragged edges of battle damage with portable oxy-acetylene cutting torch pack. Two large tanks hold 22 cu. ft. of oxygen, the small one 10 cu. ft. of acetylene. Note readily detachable regulator.

o o o

CUTTING deck plate with portable torch. Complete unit in fireproof canvas pack stores in small aluminum locker.

o o o

Effect of Phosphorus on the Hardness of Quenched Cast Iron

AN investigation in which specimens of five cast irons containing 0.12 per cent, 0.35 per cent, 0.52 per cent, 0.91 per cent and 1.18 per cent of phosphorus were quenched in water and in oil after holding at temperatures of 1292 deg., 1472 deg. and 1652 deg. F. for periods up to 4 hr. is described by F. Bischof in *Giesserei*, 1944, vol. 31, April, pp. 53 to 55.

After quenching from below the A_1 point, the hardness was less than that in the as-cast state, owing to the formation of pearlite; increasing the holding time did not affect the hardness in this case. At temperatures of 1472 deg. and 1652 deg. F., increasing the holding time decreased the hardness after quenching. For temperatures of 1652 deg. F., the highest hardness was obtained with the iron containing 0.52 per cent phosphorus. The reduction in hardness after quenching was due to the phosphorus promoting the precipitation of carbon from solid solution.

Silver Brazing In Aircraft Production

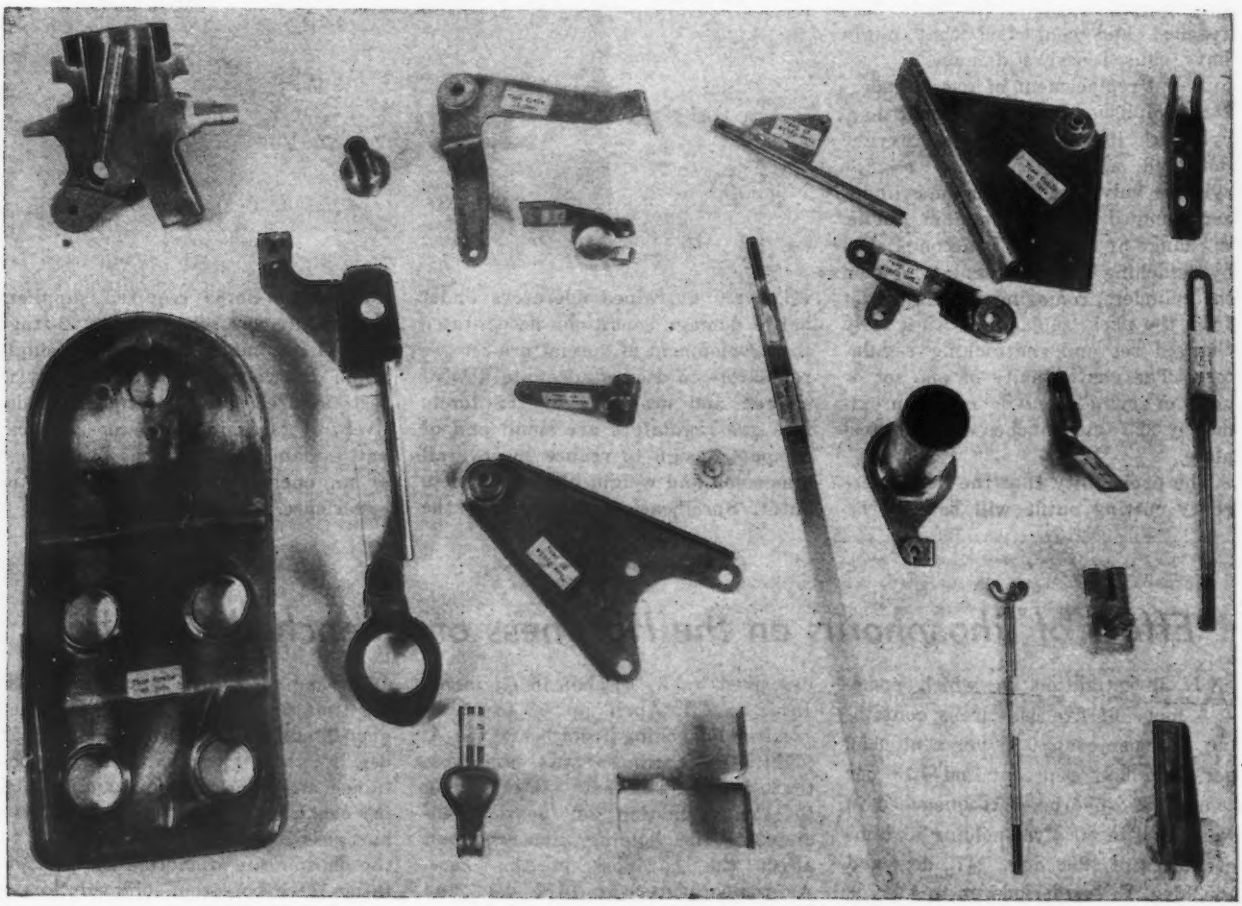
By J. P. WEED
General Foreman,
North American Aviation, Inc.
Inglewood, Cal.

. . . Because it requires less skill and training, silver brazing is replacing gas and arc welding in the fabrication of many of the smaller aircraft component assemblies. The various methods of silver brazing currently in use are reviewed by the author and the factors making for sound assemblies discussed.

EARLY in 1944 increased demands were made upon production departments manufacturing welded assemblies for aircraft. The shortage of skilled welding operators was acute. Therefore it became imperative that something be done to increase production without an increase of personnel. Several approaches to this objective were immediately studied. Among these was the use of silver brazing as a substitute for older methods of fabrication by welding. Casual observation immediately pointed to several assemblies where the use of silver solders not only increased production but actually improved both the appearance and strength of the job while reducing the weight. More intense study of the possibilities of the use of silver brazing in aircraft assemblies resulted in the redesign of some assemblies and the procurement of additional equipment with automatically or semi-automatically controlled heating. As the use of these controlled heating devices has become more general, the field for the use of silver brazing alloy in aircraft has become almost unlimited except for certain highly stressed members.

It was found that the high degree of ductility and malleability of silver brazing alloys gives two important advantages: First, joints made with them provide great resistance to vibration and severe shocks. Second, assemblies can be fabricated easily

• Typical silver brazed aircraft assemblies •



into a wide variety of sizes and shapes, thus making it possible to obtain joints in the form most convenient and economical for the different conditions under which they are used.

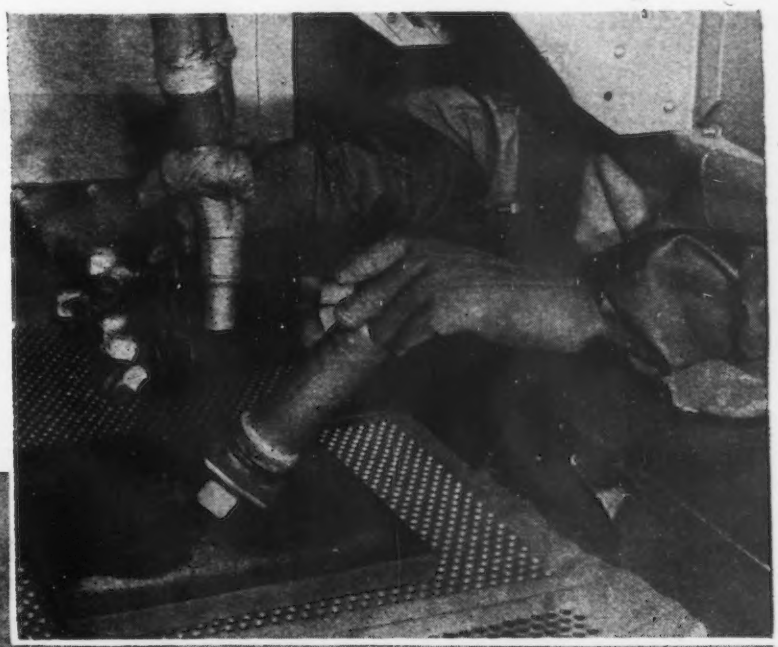
Silver alloys can be applied to any type of joint. Although scarf, lap, and sleeve joints on sheet metal, piping and tubing have the advantage of providing a greater bonding area than butt or seam joints, experience has shown that the strongest joints are produced with a minimum amount of clearance. The free flowing characteristics of silver alloys makes it possible and advantageous to provide closely fitted joints that require a small amount of silver brazing alloy. Properly fitted joints are economical in the use of silver alloys; and the neatness of these joints, which in many cases are practically invisible to the naked eye, is often a decided advantage where plating, painting or other processing is required.

Silver has many extraordinary qualities. When melted it is extremely fluid. It is also one of the most ductile of metals. Its electrical conductivity is 6 per cent higher than copper. When alloyed with other metals, such as copper, for example, silver unites to form compositions[1] having flowing temperatures lower than either of the individual metals.

The extreme fluidity of melted silver base brazing alloys gives them the ability to penetrate quickly into narrow openings. Capillary action spreads them evenly over the surfaces to be joined where they diffuse into metal surfaces and form a bond which is practically indestructible. Low working temperatures and rapid penetration thus make silver brazing an exceptionally fast method of joining metals.

The ductility and strength given by

[1] *A common alloy for brazing ferrous metals contains* 50 *per cent silver,* 15½ *per cent copper,* 18 *per cent cadmium and* 16½ *per cent zinc. It melts at* 1160 *deg. F. and flows freely at* 1175 *deg. F.*



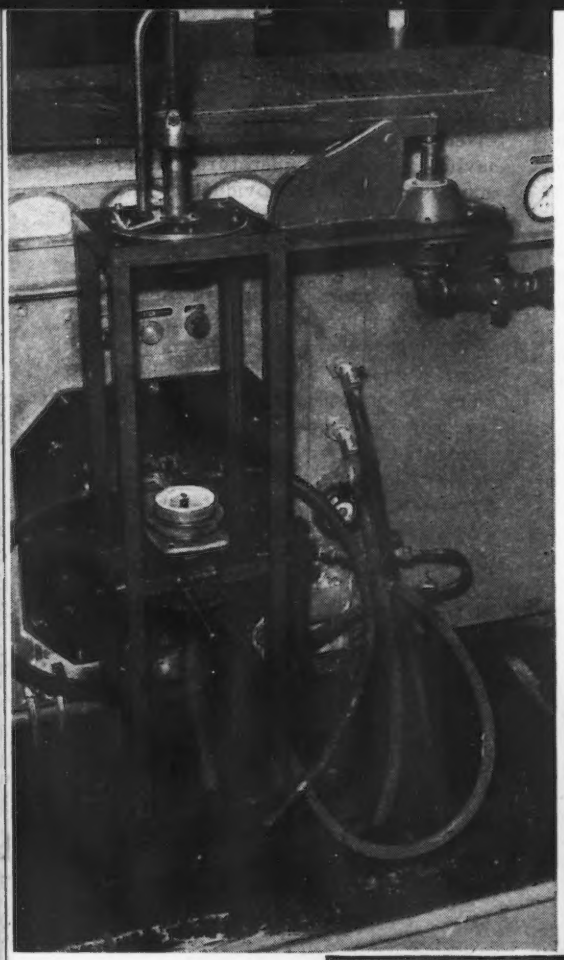
RIGHT

INTERIOR of sandblast cabinet used in preparing steel parts for brazing. Shown is the tailwheel assembly illustrated elsewhere.

o o o

BELOW

EXPLODED hydraulic tailwheel assembly silver brazed.



ABOVE
INDUCTION unit setup for silver brazing, showing type of jigging employed.

o o o

RIGHT
TYPE of jigging used for silver brazing with oxy-acetylene torch

or shear type joint is the design generally recommended although the others can be used satisfactorily under some conditions.

Lap type joints are generally used because any desired factor of safety can be incorporated by varying the lap shear area. This type of joint offers better resistance to corrosion due to the small area of brazing alloy exposed. Joints can be held in place readily, and in joining flat parts, a little pressure will insure complete bonding. In shear joints, which include tubular members, pressure cannot be exerted and correct clearance must be maintained to insure proper capillary action.

In setting up procedure for production in silver brazing, there are five simple but important factors to be observed:

1—Clearance between parts.

2—Cleaning of metal surfaces.

3—Proper fluxing of parts to be joined.

4—Locating device or jig.

5—Heating method.

Clearances for silver brazing are important. Metal to be joined should fit closely enough to permit the effective working of capillary action. From experience in the laboratory and field, it has been found that clearances of from 0.001 to 0.006 in. on flat or tubular work give the strongest and soundest joints. Clearances which are too close cause bare spots where brazing alloys are unable to flow. Enough clearance should be allowed to make certain that there will be a film of brazing alloy throughout the joint. When brazing alloys are preplaced in the form of thin inserts, a little pressure on the joint while heating, forces out excess alloy and leaves a film that takes care of irregularities in joint surfaces.

It has been found that it is an absolute necessity to have the surfaces of the joint clean and protected with flux. Grease, oxides, scale, and dirt of any kind must be removed; extra care taken in this regard will eliminate many of the causes of defective joints. Mechanical and chemical cleaning[2] can be used either together or individually as required.

[2] *See "Metal Cleaning Before Silver Brazing," by Jean Gauthier,* THE IRON AGE, *March 22, 1945, page 56.*

The temperatures required for the use of silver brazing alloys will cause the oxidation of the surfaces of both the silver and metals being joined and provision should be made for preventing this oxidation as far as pos-

silver are also closely related to their flowing qualities. Silver brazing alloys in themselves are strong, having tensile strengths of from 40,000 to 60,000 lb. per sq. in., but when thin films penetrate into a joint and bond with metals, they have the unique ability to give strength far beyond their basic strength.

It is of the utmost importance that silver brazed joints be properly designed. The correct design is mainly a question of the type of joint to use and the clearances required. Of the three types of joints in general use: butt, scarf, and lap or shear, the lap

sible and for the removal of any oxides which may form. To do an effective job, a brazing flux should be entirely fluid and active at a temperature below the flowpoints of the brazing alloys with which it is used. A fluoride type of paste flux beginning to fuse at 800 deg. F. should start dissolving oxides immediately. At 1100 deg. F. it should be a thin colorless fluid actively dissolving all refractory oxides, including the chrome oxides. The use of a flux as a temperature indicator is strongly recommended, particularly in oxygen acetylene torch applications where it is difficult for the operator to determine when the metal parts have reached the temperature of approximately 1200 deg. F.

Where study and consideration are given to the jigging of the parts to be silver brazed, uniformity of results can be expected. Particularly is this true where production is a prime consideration. As often is the case where furnaces are used or where a number of parts are to be brazed simultaneously, the jigging of all parts to be brazed is performed by operators trained for this work and then turned over to the operators who handle the heating of the metal. Preassembly by spot welding, staking, and riveting are the three most commonly used methods in furnace and dip brazing. In torch and induction brazing, use is made most frequently of a suitable jig with properly designed holddown clamps.

Choice of Equipment

Choice of the heating method will be predicated on several factors: the type of work, volume of products and the availability of equipment at hand. Since most shops have oxy-acetylene torch equipment, it is natural that in venturing into the new field of silver brazing, such equipment will be used. As confidence in results is established, and if the work warrants speed in production, other methods of bringing metal to temperatures of approximately 1200 deg. F. are investigated.

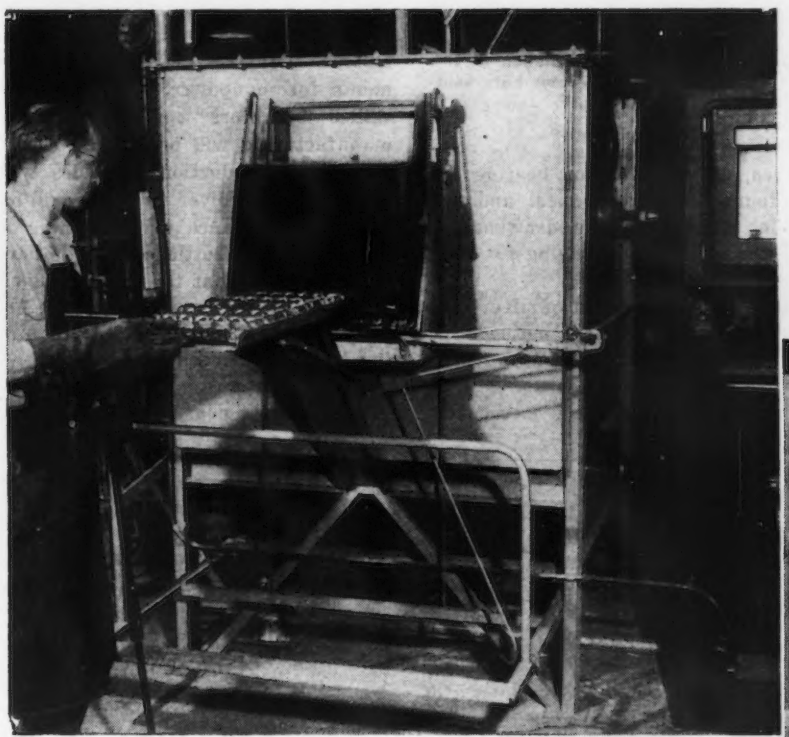
Furnaces heated by oil, gas, or electricity using either the batch principle or conveyors are conducive to rapid production of small parts in large volume. Parts to be brazed are fluxed and silver alloy preplaced before going into the furnace. Temperature of the furnace should be in excess of the flow point of the alloy for fast heating.

Incandescent carbon resistance heating or electro-brazing lends itself to the silver brazing of small parts. The part to be brazed is placed between the electrodes and held in position by pressure of the tongs. Insulated electrical parts can be joined in this manner without fear of damage to insulation. Whether to hand feed the silver alloy or preplace it in thin insert form depends upon the job.

Resistance brazing responds to the ingenuity and equipment available to production management. Those who have used this method of heating parts to be silver brazed have found an answer to heavy production on types of work where it is practical to preplace the alloy.

Dip brazing is the employment of the metal bath or the chemical bath. The metal bath requires that parts be held in brazing position and dipped into a molten bath of brazing alloy. Brazing of this kind is used mostly to join comparatively small work. Crucibles for holding the molten alloy may be heated by gas, oil or electricity.

The chemical bath also offers the advantage of fast heating and, as does the metal bath, provides protection from the oxidizing effect of the atmosphere. The salt mixtures used are heated in a suitable furnace.



ABOVE

ASSEMBLIES and preplaced silver alloys entering electric furnace prior to brazing. Hydrogen is used for the furnace atmosphere.

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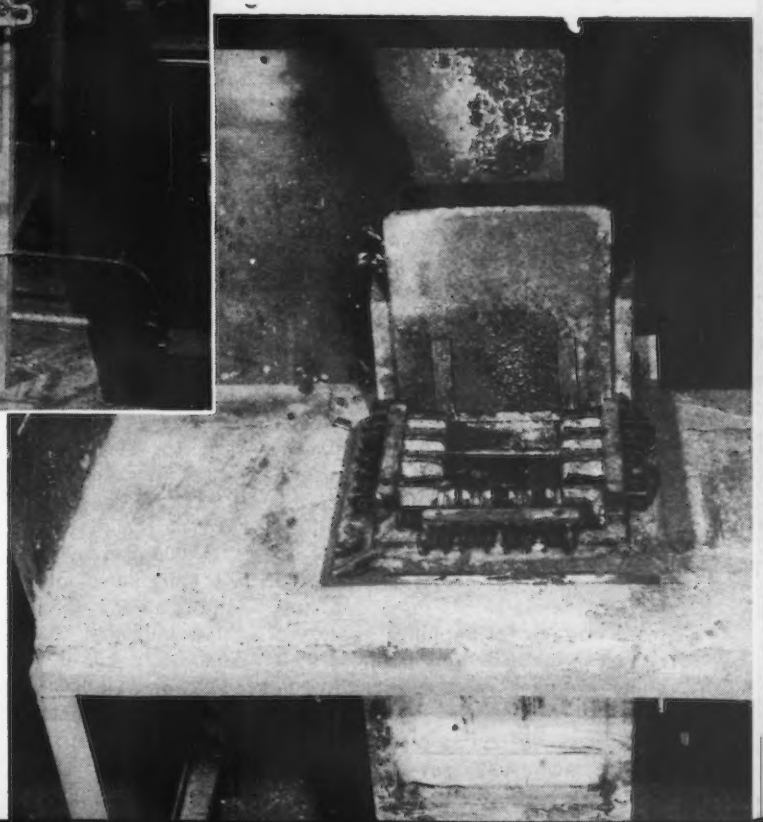

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ELECTRICALLY heated silver bath used in dip brazing of steel assemblies.

Work must be supported in jigs and the brazing alloy preplaced. Brazing temperatures are easily controlled. The size of the salt bath depends upon the size and weight of the work. Baths should be large enough to show no appreciable temperature drop when the parts are immersed.

Induction Heating

The use of induction heating in silver brazing is the most modern and satisfactory method from the aircraft manufacture viewpoint. Induction heating is produced by inducing a high frequency current in the part or parts to be heated from a water cooled copper or brass coil. Current for the coil can be supplied either by motor-generator set, spark gap, or vacuum tube oscillator equipment. The frequency ranges from around 10,000 to 450,000 cycles per sec. Advantages in using induction type heating units are that, normally, very simple jigging for holding parts is needed, and tooling, in the form of copper coils for the heating unit, is inexpensive and requires a very short time for manufacture and installation. Production rates, for "batch lots" as commonly set up in aircraft manufacture, are very rapid. Changeovers in production from one part or assembly to another require only a few minutes. Control of volume and location of heat is positive and variable. Once the time settings are properly determined, it is possible for even the most inexperienced labor to operate the unit without variation.

Primary disadvantages in the use of induction units are initial high costs. However, where a large volume of variable types of heat treating and silver brazing assemblies is required, use of induction heating will be found to be economical and versatile, overcoming the drawback of high initial cost and paying for itself in a very short time.

REMOVING flux on completion of silver brazing in a hot water bath held at 180 deg. F.

Discussion of the cost of silver brazing by any of the above methods has purposely been avoided. However, a few comparisons of cost using silver alloys rather than other methods of manufacture indicate that although the initial cost of silver alloy is high in comparison with other materials, there is an appreciable saving both in assembly and in the alining of parts preceding brazing. Furthermore the fact that skilled operators are not required makes the cost of silver alloys almost a negligible factor in the completed assembly cost. This cost always varies according to the clearances allowed in the setup, but extremely small amounts of silver alloys are always used in comparison with the older manufacturing methods. For example, one assembly, a retractable landing gear, formerly using 6 oz. of welding electrodes has been converted to silver brazing and requires but ⅓ oz. of silver alloy.

Weight reduction, while maintaining high strength factors, is unfolding a new field for low temperature silver brazing. Castings with complicated machine operations are being surveyed for replacement with silver brazed parts. As often is the case, metal stampings can be joined with silver alloys, reducing and frequently eliminating machining operations.

The Armed Forces have again informed industry of their requirements for manpower. Many of our skilled operators now in aircraft manufacturing will be called. Equal or greater production schedules will be required. Silver brazing can be of great assistance in overcoming a new production bottleneck. It is now very apparent that the uses of silver alloys in producing lighter, stronger, better appearing assemblies, requiring less time, are on the threshold of very rapid expansion in aircraft manufacture in the near future.

No Wear Allowances Needed on Sapphire Gages

SAID to outlast the hardest tool steels and cemented carbide gages hundreds of times, sapphire plug and ring gages are now being offered by the Sapphire Products division of the Elgin National Watch Co., Aurora, Ill. Next to the diamond, sapphire is the hardest substance on the mineral scale. Because of this, sapphire plug and ring gages may be ordered to the exact size needed, with no wear allowance required.

Moreover, sapphire is not affected by any chemical ordinarily encountered in gaging. Sapphire gages are remarkably strong and stand up well under ordinary shock of handling in use. Since they are not subject to burring, it is impossible to gage parts inaccurately as a result of unnoticed damage to a gage. No Elgin sapphire gage has yet worn out.

Reports of users offer evidence of the unique performance of this newest type gage. O. R. Swanson, chief inspector of the Stewart-Warner Corp., for example, states:

"As we advised you previously, your plug gages were gaging as high as 80,000 parts without showing wear. We since have increased gagings to approximately 158,000. A thorough check indicated that there has been some wear, but it was hardly appreciable, about 0.00001 in. We had been accustomed to getting but 300 gagings, on the average, from high speed steel gages.

The American Perforator Co.'s experience was similar. In a recent letter, Ray Anderson, plant superintendent, wrote: "With a series of sapphire plug gages, we are gaging internal diameters which must be lapped to a total tolerance of 0.0001 in. On one size, 0.0721 in., we have averaged 2000 gagings per working day since early in June. Even in the case of those 0.0721 plugs that have been in use since the original delivery in March, we have yet to encounter as much as 5 millionths of an inch wear."

Overshooting Prevented in Temperature Control

By M. J. MANJOINE
Research Engineer,
Westinghouse Electric & Mfg. Co.,
East Pittsburgh

o o o

A SERVO-TYPE thermocouple device which increases the sensitivity and response of conventional temperature controls has been developed by Westinghouse Electric & Mfg. Co., East Pittsburgh. This instrument consists of two thermocouples of different thermal capacity and an electric heating element, enclosed in an evacuated glass envelope. Changes in electric furnace temperatures are anticipated and corrective steps taken to minimize the cyclic temperature swings characteristic of most furnace controls. As an example of the efficiency of the device, a heat-treating furnace varied over a range of 50 deg. F. (± 25 deg.) prior to supplementing the control with this anticipator. After connecting and adjusting the anticipator the variation was 5 deg. (± 2½ deg.)

When the temperature of a furnace is controlled by a single thermocouple within the heating chamber, the temperature rises sharply until it reaches a predetermined point where the control operates to disconnect the furnace from the power line. Because of the large thermal capacity of the heating elements and the furnace itself, the temperature continues to rise — but less sharply—to a maximum and then begins to fall. At a present minimum temperature (which may coincide with the maximum) the controls again connect the furnace to the line. Here again the flywheel effect of the furnace thermal capacity causes the temperature to continue to drop until a minimum is reached at which point the temperature again begins to rise. The overshooting on the heating and cooling portions of the control cycle result in a considerable temperature range between the high and low temperatures of the cycle.

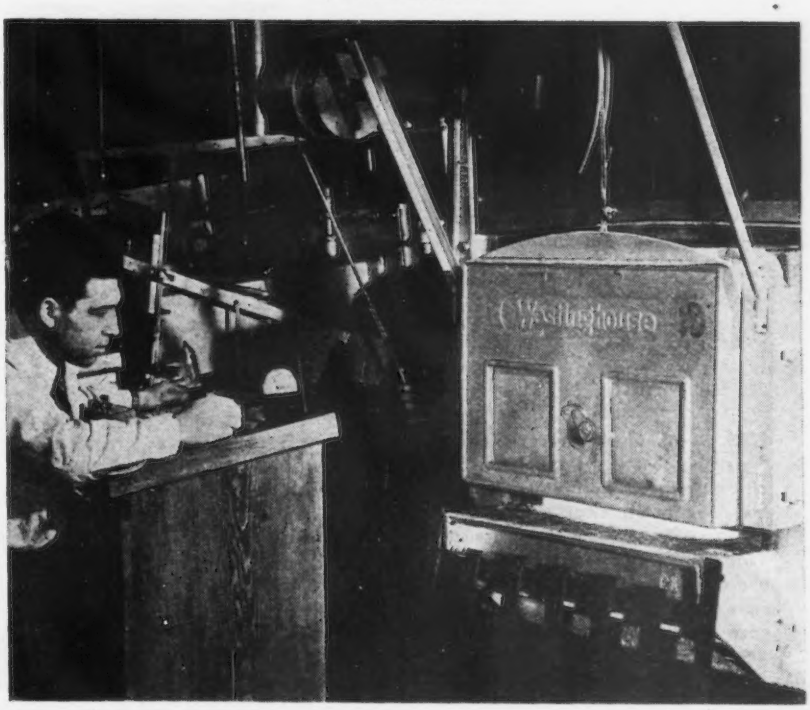
Because of the different characteristics of the thermocouples used, the anticipator, reacts to temperature changes, quicker than the furnace thermocouple and initiates the control operation sooner, thus, minimizes temperature fluctuation. The two thermocouples in the instrument and the control thermocouple in the furnace are connected in series so that the polarity of the thermocouple with less thermal capacity is additive and the thermocouple with greater thermal capacity is subtractive with respect to the furnace thermocouple.

The heating element of the instrument is energized by the power source connecting the control mechanism and the relays that operate the main power contactors. Thus the furnace and instrument heating elements operate together. The two thermocouples in the instrument are equidistant from the heater but the element with the lesser thermal capacity reacts first to changes in heater element temperature.

When the two thermocouples in the anticipator are at the same temperature, the voltage from the control thermocouple to the control mechanism is constant. At the instant that the control thermocouple institutes a change in control current, for example, starting the heating part of the cycle after having been off, the change is felt first in the two thermocouples in the anticipator. However, the thermocouple with the lower thermal capacity heats faster than the other and the thermocouple voltage at the temperature control mechanism is increased. This increased voltage causes the controller to change to cooling, thus preventing the furnace temperature from overshooting the desired maximum. When the opposite action takes place and the furnace is in the cooling portion of the cycle, the anticipator thermocouple with larger thermal capacity cools more slowly and its reversed polarity causes the control mechanism to change to heating and keep the furnace temperature from overshooting the minimum limit. A variable resistance in the heater circuit of the anticipator provides a means of controlling the frequency of operation of this supervisory furnace temperature control.

Should the line voltage dip (or rise) the instrument heater reflects this change much quicker than the furnace heating elements and the control is properly energized to correct for the power variation before the need is recognized by the thermocouple in the furnace.

THE vacuum tube temperature control is shown in use by the inventor, M. J. Manjoine, research engineer of the Westinghouse research laboratories. The device anticipates temperature changes in the furnace and acts with great sensitivity to keep the temperature constant.



. . . Gun Welders Fabricate Weapon

INDICATIVE of the ability of spot welding to simplify the fabricating of complicated sheet metal assemblies of different sizes and types is the process used in producing the weapon carriers at the main plant of the Dodge Division of Chrysler Corp. in Detroit. Here, right hand and left hand carriers in two sizes each are assembled at the rate of 770 assemblies per day from a large number of individually stamped, rolled or drawn parts ranging from 20 gage steel body stock to ⅛ in. steel strip. The assembly requires a total of over 400 spot welds per completed unit and 30 portable resistance welding guns are employed to fabricate all the units.

A total of over 130,500 completed assemblies of these welded weapon carriers, Fig. 1, have rolled off the Dodge assembly line since Pearl Harbor. This production has been attained by adaptation of modern motor vehicle body spot welding techniques using portable scissors type, spot welding guns. Only four sizes of guns are required to accommodate the clearances encountered and the same guns spot weld both the light and the heavy gage materials with equal effectiveness through the use of selective dual "heat" control buttons.

The guns are air-hydraulic operated, water cooled, with electronic synchronous timing control and contactors to assure uniform welding current and to eliminate burned or cold welds. They may be moved freely around the work since they are suspended in counterbalanced swivel supports from overhead monorails (See Fig. 2). Welding transformers used for the various guns range in capacity from 35 to 50 kva.

The weapons carriers are long, box-like containers with two main compartments which can be attached to the outsides of Dodge army trucks, Fig. 1, to house the various small weapons and ammunition employed by infantry units. Brackets inside the compartments permit installation of wooden separators for carrying small items of various types. The carriers are made in two lengths: A 5-footer for the Dodge 4 x 4 (a truck hav-

ABOVE

FIG. 1—Weapon carriers instead of rear fenders (with built-in clearance for wheel housings) provide extra "payload" capacity for Dodge army trucks. The ¾-ton 4 x 4 truck, mounting a 37 mm. gun and right and left hand weapon carriers as shown, is a common sight at advanced army bases providing high mobility for light artillery, etc.

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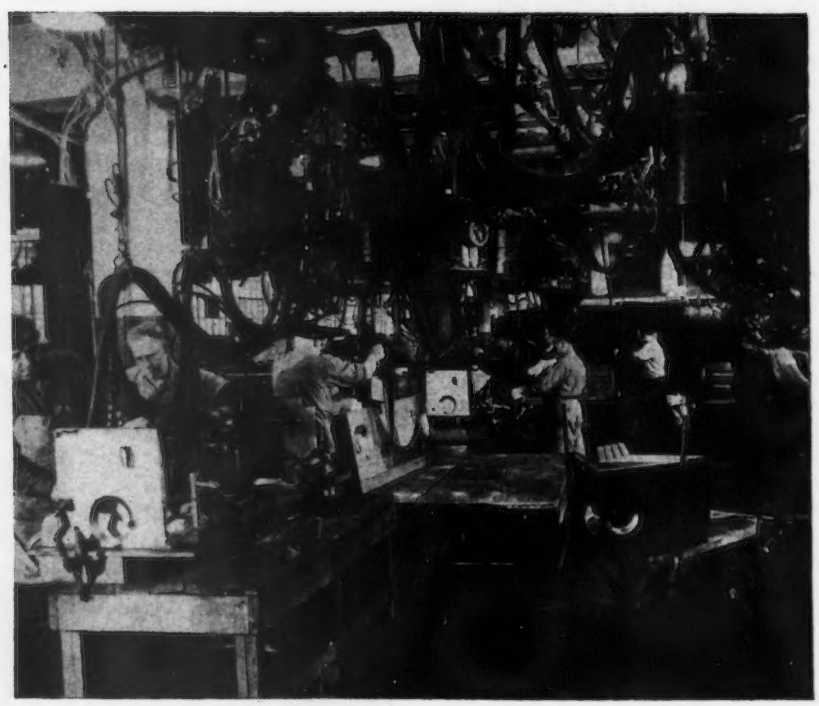

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FIG. 2—An advantage of the use of welding guns with transformers and all controls mounted overhead is that the floor is left clear below. Only four sizes of welding guns are required to accommodate the clearances encountered in making the more than 400 welds required for each weapon carrier assembly composed of dozens of individual stamped, rolled and drawn parts.

Carriers . . .

o o o

By JOHN D. GORDON
Progressive Welder Co., Detroit

o o o

ing four wheels, each independently driven), and a 6-footer for the Dodge 6 x 6 (a truck having six wheels, all independently driven). The lids of these carriers form seats for the transport of personnel. Stake brackets welded to the carriers permit increasing dimensional load capacity of the truck.

The assembly is built around a U-shaped "backbone" rail, Fig. 3 made of 20 ga. cold rolled stock to which 14 brackets of six different types are attached to this rail. Each bracket is composed of from two to four individual pieces of ⅛ in. stock.

In the first operation, the 14 brackets are subassembled on pedestal welders, from two to eight spots per bracket being required. The second subassembly operation consists of forming the L-shaped end panels of the carrier. Attachment flanges and stiffeners are spot welded to stamped and drawn sheets to form these panels, requiring a total of 52 spot welds, for each subassembly.

Next, the 14 brackets are spot welded to the backbone rail, Fig. 3. A total of 120 spots are required on each assembly.

A completed backbone rail, three bottom center panels, a back panel, and a completed L-shaped end panel are now all clamped into a simple work holding fixture provided with quick-action hand operated toggle clamps (See Fig. 4). Two operators—using scissors-type welding guns—complete this assembly, making 130 spot welds.

The assembly is now moved to a table where the wheel housing and bottom panels are spot welded to the back panel and the rail. Stake brackets are arc welded to the back panel and the rail, and the assembly joints are reinforced by arc tacking flanges together at all corners to insure maximum rigidity in the completed structure. Spot welding cannot be used at these points because these flanges do not overlap.

Wood panels for the lids, front, and compartment separators are hand attached with screws, to complete assembly of the weapon carrier.

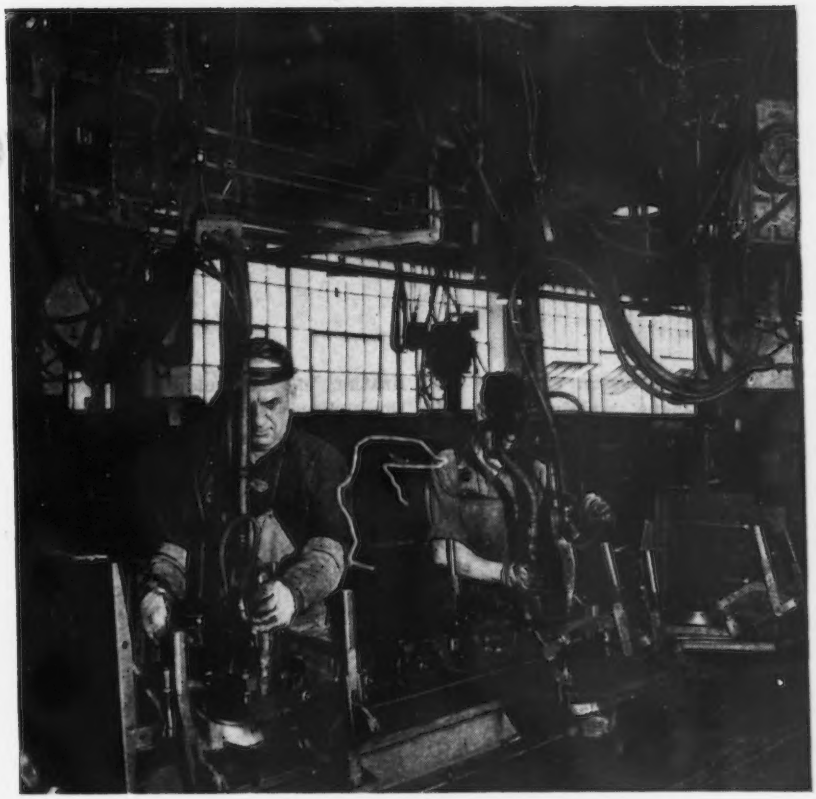

FIG. 3—Key operation of the assembly sequence. Here, a backbone channel, end and back panels, reinforcing and attachment brackets and deep drawn wheel housings are clamped in a simple fixture while two operators make 130 spot welds on the assembly.

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FIG. 4—Specially designed portable welding guns with selective dual "heat" control buttons permit alternate welding of thin and heavy sections as the operators move around the subassemblies.

▲ ▲ ▲ Gas and Heliarc Welding Of

THE differences in efficiency of oxyacetylene welding and of Heliarc welding on sheet magnesium alloys have been recognized, but the need to ascertain those differences in terms of comparative percentages for various types of currently available sheet magnesium, led the Consolidated Vultee Aircraft Corp.'s Fort Worth, Texas, division to carry out an extensive testing program. The welding specimens were made to satisfy several conditions, such as stress relieving after welding and its absence, welding parallel to and normal to the grain of the metal, and the utilization of the welding facilities of three departments making the welds with different electric constants and gas pressures. The results point to an average difference in efficiency of 8 per cent in favor of Heliarc welding.

Sheet magnesium was obtained in various thicknesses from 0.040 to 0.125 in. in specifications AM-3S-O, AM-3S-H, AM-C52S-O, AM-C52S-H, and AM-C57S-H from the American Magnesium Co. and in specifications FS-Ia, FS-Ih, and JI-h from the Dow Chemical Co.

The material was cut into 3 x 6 in. pieces. Four of these pieces of each type and in each gage were sent to three departments to be butt welded. (The departments are designated in the tabular material as the production welding department, experimental tooling department, and experimental department.)

Welding Methods Used

Half of each type and thickness were welded by the Heliarc method and half by oxyacetylene. Some of the welded sections were stress relieved by heating after welding. Also about half of the pieces were welded parallel with the grain of the metal and the remainder welded perpendicular to the grain. Two of the 3 x 6 in. pieces were welded along the 6 in. side making a welded piece 6 x 6 in. Three or four strips 1 x 6 in. were cut from the inner portion, cutting across the weld of the 6 x 6 in. piece. Test coupons were made from these pieces measuring 6 in. long, about 15/16 in. width at the weld and 1 in. width at the outer extremities. All specimens were tested in tension in a 5000-lb. Tinius Olsen testing machine, obtaining the per cent elongation and the ultimate tensile strength. The results of the tests are given in the tables.

TABLE I

Comparison of the Efficiency of Gas and Heliarc Butt Welds on Magnesium Alloys (Tests made in three welding departments)

Magnesium Alloy	Gage, In.	Per Cent Efficiency					
		Production Welding Department*		Experimental Tooling Department*		Experimental Department*	
		Gas	Heliarc	Gas	Heliarc	Gas	Heliarc
AM-3S-O	0.040	78	64	53	59	65	70
AM-3S-O	0.052	..	..	75	67	71	70
AM-3S-O	0.064	69	79	72	71	71	83
AM-3S-H	0.091	79	71	66	72	59	57
AM-C52S-O	0.040	..	..	93	82	..	..
AM-C52S-O	0.064	71	102	96	102	66	90
FS-1a	0.072	93	101	97	106	86	94
FS-1a	0.082	101	112	85	107	58	73
FS-1h	0.064	66	80	73	96	66	52
AM-C52S-H	0.040	89	80	73	89	..	..
AM-C52S-H	0.052	..	..	77	86	..	..
AM-C52S-H	0.064	84	90	68	78	69	107
AM-C52S-H	0.071	..	..	74	71	..	..
AM-C52S-H	0.082	..	..	85	86	56	66
AM-C52S-H	0.091	63	94	57	..	..	..
AM-C52S-H	0.102	87	90	71	..	..	..
AM-C57S-H	0.040	..	..	76	96	..	..
AM-C57S-H	0.064	..	..	84	93	..	..
AM-C57S-H	0.091	71	100	75	93	55	61
AM-C57S-H	0.102	..	..	78	93	..	..
J1-H	0.040	..	..	74	93	..	..
J1-H	0.064	92	71	87	87	60	77
J1-H	0.102	94	92	80	93	..	..
J1-H	0.125	..	..	71	80	..	..
Average		82	86	76	85	66	81

* See Table IV for welding conditions employed in each department.

TABLE I-A

Average Weld Efficiency by Alloy and Process

Alloy	Per Cent Efficiency	
	Gas	Heliarc
AM-3S-O	69	70
AM-3S-H	68	67
AM-C52S-O	82	94
FS-Ia	87	99
AM-C52S-H	73	85
FS-Ih	68	76
AM-C57S-H	73	89
J-Ih	80	85
Average (All Alloys)	76	84

Magnesium Alloys ▲ ▲ ▲

By F. E. HEATLEY
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Table I shows that Heliarc welds of all material tested gave an efficiency of 84 per cent compared to 76 per cent for oxyacetylene welds of the same material. This comparison shows that Heliarc butt welds are 8 per cent stronger than gas butt welds. (The efficiency of the welds is the ratio of the ultimate tensile strength of the weld to the ultimate tensile strength of the base metal.) Table I-a lists the per cent efficiency by alloy.

Analysis of Results

From Table I, it may be observed that in Heliarc welding, AM-C52S-O, FS-Ia, FS-Ih, AM-C52S-H, AM-C57S-H and JI-h magnesium alloys have excellent properties and 3S-O and 3S-H alloys have fair properties. In oxyacetylene welding, FS-Ia and JI-h alloys have excellent properties, 52S-O and 52S-H alloys have good properties, AM 3S-O, AM 3S-H, FS-Ih, and AM-C57S-H alloys have fair properties.

Heliarc welds broke at the edge of the weld in 77 per cent of the tests, compared with 61 per cent for gas welds. (Edge of the weld defined as from ⅛ to ½ in. from the weld bead.) Heliarc welds broke in the weld in 23 per cent of the tests compared with 39 per cent for gas welds. This indicates that welds breaking at the edge of the weld are stronger than welds breaking in the weld and this is especially true in Heliarc welding.

Presence of Blowholes

A majority of welds breaking in the weld have blow holes, in contrast to welds breaking at the edge of the weld which do not have blow holes or only a few small ones. An examination of the fractured specimens having 80 per cent or more efficiency, shows no blow holes or only a few small ones. Fractured specimens having 70 per cent or less efficiency show many blow holes of various sizes, mostly in the deposited weld material and to a lesser extent in the parent metal. It seems evident that the cause of blow holes in weak welds—less than

. . . Tests made in Heliarc and oxyacetylene welding on currently available magnesium sheet indicate a higher percentage of efficiency for the Heliarc method.

70 per cent efficiency—is from burning, that is, the flame is held too long on the weld. A checkup in the shop proved that the cause was not due to an oxidizing flame, as in all cases a good reducing flame was used.

Table II shows that in both Heliarc and gas welds, welding perpendicular to the grain of the metal has a slight advantage over welding parallel with grain of metal. The average efficiency of all welds perpendicular to the grain of the metal is 83 per cent compared to 78 per cent for welds parallel with the grain.

Table III shows that relieving the stresses after welding, by heating from ¼ to ½ hr. at 250 to 500 deg. F. has no advantage over welds without stress relief as far as strength is concerned. Welds, heated to 1 to 2 hr. at 250 to 500 deg. F. have a slight advantage over welds without stress relief. Considering the time expended, it is not advantageous to stress relief welds by the above methods if

TABLE II

Comparison of Joint Efficiency When Welding Normal to and Parallel With Grain of Metal

Alloy	Gage	Per Cent Efficiency			
		Gas		Heliarc	
		Parallel	Normal	Parallel	Normal
AM-3S-O	0.040	65	79	64	..
AM-3S-O	0.052	..	75	69	..
AM-3S-O	0.064	68	71	69	86
AM-3S-H	0.091	52	68	57	72
AM-C52S-O	0.040	59	93	63	..
AM-C52S-O	0.064	79	66	101	100
FS-1a	0.072	92	93	100	101
FS-1a	0.082	81	..	97	..
FS-1h	0.064	68	..	76	..
AM-C52S-H	0.040	89	55	80	89
AM-C52S-H	0.052	57	77	..	86
AM-C52S-H	0.064	72	..	94	94
AM-C52S-H	0.072	..	74	..	71
AM-C52S-H	0.082	58	85	66	86
AM-C52S-H	0.091	71	60	91	94
AM-C52S-H	0.102	..	71	56	50
AM-C57S-H	0.040	75	..	..	96
AM-C57S-H	0.064	..	84	93	92
AM-C57S-H	0.091	73	55	100	77
AM-C57S-H	0.102	87	..	..	93
J1-h	0.040	74	..	..	93
J1-h	0.064	83	97	81	92
J1-h	0.102	94	..	82	95
J1-h	0.125	71	..	92	72
Average	.....	75	77	87	81

TABLE III

Weld Efficiency With and Without Stress Relief After Welding

Alloy	Gage In.	Per Cent Efficiency								
		Without Relief	250° F. 4 Hr.	300° F. ¼ Hr.	300° F. ½ Hr.	300° F. 1 Hr.	400° F. ¼ Hr.	400° F. 2 Hr.	500° F. ½ Hr.	500° F. 2 Hr.
AM-3S-O	0.040	66	..	..	..	..	..	..	..	66
AM-3S-O	0.052	67	..	..	70	..	..	..	..	..
AM-3S-O	0.064	60	..	..	..	..	..	62	..	..
AM-C52S-O	0.035	72	..	..	..	..	..	..	..	87
AM-C52S-O	0.040	50	..	..	47	..	..	..	..	..
AM-C52S-O	0.064	119	..	..	..	..	..	..	106	..
AM-C52S-H	0.040	79	..	..	..	100	..	..	..	..
AM-C52S-H	0.064	106	..	..	..	..	108	..	..	..
AM-C57S-H	0.040	80	85	..	..	..	..	..	..	..
AM-C57S-H	0.064	93	..	92	84	..	..	..	..	..
AM-C57S-H	0.102	94	..	87	70	..	..	..	..	..
JI-h	0.064	93	..	92	84	..	..	..	..	..
JI-h	0.125	76	..	..	62	..	..	..	..	..

Average efficiency of welds with stress relief after welding—83 per cent.
Average efficiency of welds without stress relief after welding—82 per cent.

strength and elongation are the only criteria for good welds.

The various operating conditions observed in the three departments are shown in Table IV for both gas and Heliarc. The use of 19 lb. oxygen pressure and 6 lb. acetylene pressure in the experimental department under conditions "B" was regarded as too high to maintain a good reducing flame. In place of these pressures 8 lb. for oxygen and 4 lb. for acetylene was recommended. Similarly, the tests indicated that not more than 5 lb. helium pressure is desirable.

Elongation is a criterion of weld soundness, good welds having high elongation and poor welds low elongation. On this basis Table V shows that AM-C52S-H, FS-Ih, AM-C57S-H, and JI-h magnesium alloys have excellent properties; AM-C52S-O and FS-Ia alloys have good properties, and AM 3S-O and AM-3S-H alloys have fair properties. The above observation compares favorably with the weld efficiency of Table I, with the exception that AM-C52S-O and FS-Ia alloys show excellent tensile properties in Table I.

Scattered and low results are believed to be due in great part to the inexperience of the welders. The samples tested were among the first materials welded at the Fort Worth division and it is felt that further experience will increase weld efficiencies.

TABLE V

Elongation Results for All Magnesium Alloys

Magnesium Alloy	Elongation, Per Cent in 2 In.	
	Welded Material	Material As Received
AM-3S-O	3	12
AM-3B-H	2.4	4
AM-C52S-O	7	12
AM-C52S-H	4	4
FS-Ia	5.5	12
FS-Ih	4	4
AM-C57S-H	3	3
JI-h	3.4	3

TABLE IV

Welding Conditions Observed in All Departments

	Production Welding	Experimental Tooling	Experimental A	Experimental B
HELIARC WELDING				
Volts	10-15	18-22	15	4
Amperes	40	35-42	40	30
Helium pressure, lb.	8	½ to 1	5	18
Tungsten electrode, in.	⅛	⅛	⅛	⅛
Filler rod, in.	⅛	⅛ & 3/32	3/32	3/32
OXYACETYLENE WELDING				
Oxygen pressure, lb.	8	5	8	19
Acetylene pressure, lb.	4	3	4	6
Filler rod, in.	⅛	⅛ & 3/32	3/32	3/32
Flux	No. 3	Mg	Mg	Mg

o o o

LEFT

THE table on the left was used on gages from 0.040 to 0.091. The voltage and amperage were increased 20 per cent on gages from 0.091 to 0.125. Experimental tooling department used filler rod of the same material as welded parts. Production welding and the experimental departments used 3S-O rod on 3S-O material and 57S-H rod on all other alloys. A and B represent welding conditions used at two different periods. A greater number of low efficiency Heliarc and gas welds were made under conditions B, which are at variance with the other shops, than under conditions A.

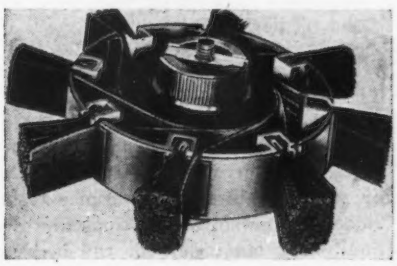
o o o

New Equipment . . .

Finishing

. . . Recent developments in polishing and cleaning units, plating equipment and other finishes are described in the following pages.

A BRUSH-BACKED sanding wheel said to be adaptable to jobs that were formerly done only by hand has been announced by *Exactone Tool & Die Co.*, 4373 Melrose Avenue, Hollywood 27. The device consists of a central magazine which houses the strip abrasive. Eight of these strips extend through the housing and are held against the work by tough bristles. The bristles cushion the abrasive making it possible to get in and around corners, hollow and fluted surfaces and small openings. Overall dimension including brushes is approximately 8 in. Normal loading contains 20 ft. of abrasive and reloading is done by unscrewing the serrated nut and removing the cover. The wheel fits all standard ½ and ⅝ in. motor shafts, stationary or flexible or can be supplied to fit almost any shaft size on request. The sander is particularly suitable for use on a flexible shaft.

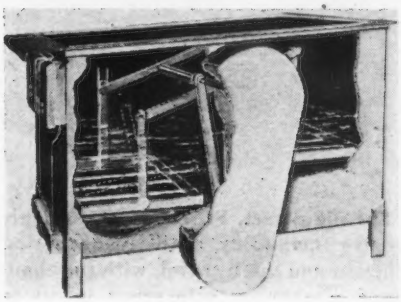


Polishing Lathe

A HEAVY-DUTY variable speed lathe with vacuum holding fixtures for polishing of the entire surface of an object has been announced by *Schauer Machine Co.*, 2040 Reading Road, Cincinnati. With this machine the part is revolved instead of bringing it up against a revolving abrasive or polishing wheel. The part is held in the fixture by vacuum. The machine is capable of handling a wide range of vacuum type holding fixtures each designed for the particular object to be held. Speeds ranging from a minimum of 100 r.p.m. to a maximum of 4800 r.p.m. in a ratio of 6 to 1 or 12 to 1 are available.

Surge Washer

A TWO stage surge washer has been announced by *Phillips Mfg. Co.*, Touhy Avenue, Chicago 45. The units consist of two compartments with a dividing insulated wall between, one of which contains the cleaner, the second the water rinse. The unit is reciprocating in action,



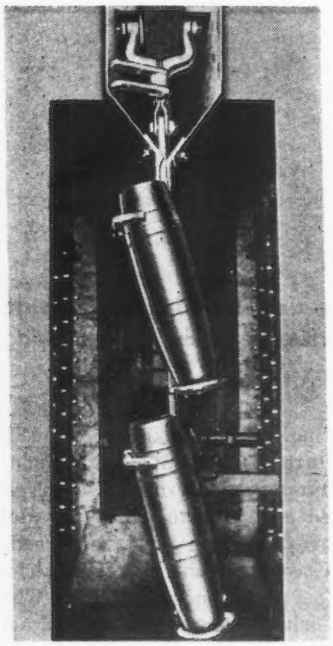
moving the rack on which the basket rests up and down through the cleaner and rinse and accommodates two baskets at one time, one being swished through the cleaner while the second is being swished through the rinse. This reciprocating cycle moves the baskets vertically through the solutions, producing the maximum of agitation for the removal of chips, soil, etc. Each tank holds 16½ gal. of solvent or water and each surge platform takes baskets 14 x 6 in. high. The reciprocating action is powered by a 1/3 hp. motor and the machine is offered in four models.

Abrasive Setup Spray Gun

THE use of a spray gun for recoating polishing wheels with Nuglu or Brushing Nuglu has been announced by *J. J. Siefen Co.*, Detroit 9. This method is said to speed up recoating jobs. Brushing Nuglu is a mixture of a liquid cold glue and an aluminum oxide grain. Nuglu is the liquid cold glue to which the aluminum oxide grain must be spread on in a trough in the conventional manner. Production in setting up wheels and belts is said to be increased about five times by the use of the spray gun, besides giving a more uniform coating.

Blast Cleaning Machine

THE addition of several models to the line of Wheelabrator swing tables has been announced by *American Foundry Equipment Co.*, 555 South Byrkit Street, Mishawaka, Ind. Four sizes are available with sizes of the single work table being 24, 66, 72 and 86 in. in diameter. Only a very short exposure of the parts to the Wheelabrator unit is said to be required to clean the exposed surfaces thoroughly and uniformly. One of the most important features of the Wheelabrator swing tables is said to be the fact that all blast cleaning operations are within the cabinet and that the operator is never exposed to the abrasive blast.



Conveyorized Spray Cleaner

A MONORAIL and conveyor type spray cleaning machine for the application of phosphate coating on metal parts before painting has been announced by *N. Ransohoff, Inc.*, Cincinnati 16. In the example of the shell unit pictured, the shells are hung on racks so constructed that they are sprayed both inside and out and are carried at a slanting angle to permit drainage. They are designed to fit into the overhead monorail systems already installed in some ammunition plants but are also designed with a self-contained monorail if desired.

Stainless Steel Shot

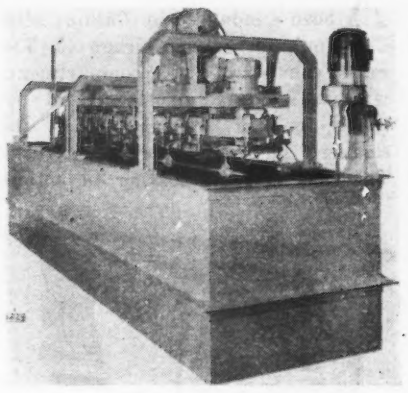
A SHOT blast for cleaning stainless steel castings, forgings and other products has been announced by *Cooper Alloy Foundry Co.*, Hillside, N. J. It consists of the use of stainless shot instead of the usual steel shot which deposits a corrodible film iron on the casting or other product being blasted. Cleaning by this method is accomplished in the conventional manner using standard shot blasting equipment.

Wire Plating Machine

THE development of a new process and machine for high speed wire plating has been announced by *Joseph B. Kushner*, 233 West 26th Street, New York 1. The machine is capable of plating wire from 0.0025 in. thick to light cable at speeds ranging from 150 to 750 ft. per min. with heavy specification deposits of almost any plateable metal. The overall length of the machine is dependent on the weight and number of metals to be deposited on the wire and may range from 18 to 36 ft. long. A variation of the machine and process is capable of plating small parts continuously at very high production rates. Parts such as radar parts can be plated to 0.0002 and 0.0005 in. (20 and 40 m.s.i.) gold silver specifications respectively at rates high enough to make the process superior in many ways to barrel plating particularly in view of the minimum amount of labor involved and the close tolerances to which it will plate.

Automatic Plating Machine

A RECIPROCATING type semi-automatic high speed plating machine with a rotating cathode has been announced by *Lasalco, Inc.*, 2818



LaSalle Street, St. Louis 10. A single drive maintains both reciprocating action and chain travel, with the chain and mechanism submerged in oil to prevent corrosion. The plating tank can be supplied with an agitator boot for either a single type of solution agitation or a combination of several motions.

Stop-Off Lacquer

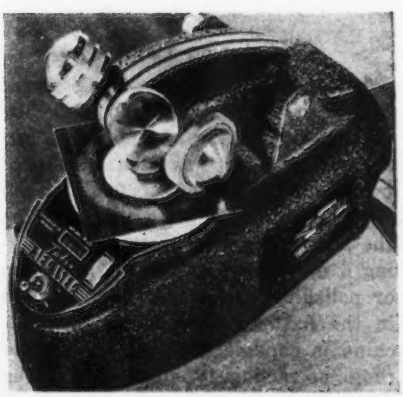
FOR covering plating racks either by itself or with Koroseal Tape RX, Koroseal RX solution is now being made in white instead of the clear color originally furnished, according to an announcement by *B. F. Goodrich Co.*, Akron, Ohio. Used as a stop-off lacquer, the white is clearly visible and the operator has no difficulty in determining just what portions of a part have been masked. When covering new plating racks the white solution shows plainly whether all parts of the rack have been covered. The white solution has the same chemical resistant properties as the clear type and gives a slightly heavier coat per dip. Liquid at room temperature, it holds its position on the rack, after dipping or painting, because of shrinkage as the solvent evaporates.

Acid Inhibitor

AN organic acid pickling inhibitor in powdered form, Pennsalt PM-40 which is highly stable and completely soluble in pickling baths of either muriatic or sulfuric acid has been developed by Pennsylvania Salt Mfg. Co., Philadelphia 7. It contains 100 per cent active ingredients and is effective at such low concentrations as 0.02 to 0.10 per cent by weight of the pickling bath. It can be used in acid pickle baths before electroplating, galvanizing and enameling since it is free-rinsing and minimizes hydrogen absorption. Concentrations may be varied as desired.

Coating Abrasive Tester

A TESTING set which includes a Taber Abraser with all accessories, together with a specimen table for running abrasion resistance tests under wet or moist conditions and an illuminated magnifier for the inspection and examination of specimens has been announced by *Taber Instrument Co.*, North Tonawanda, N. Y. The wearing action of the abraser is performed by dual Calibrase wheels bearing against the specimen under constant pressure and revolving in opposite directions, one sliding radially toward the outside and the other sliding toward the inside of the wear path. Each wheel revolving at a constant speed through contact with the specimen exerts a combined abrasive, compressive and twisting action twice in each revolution of the specimen holder. A standardized load adjustment is provided for varying the pressure of the Calibrase wheels against the specimen so the abraser will test both delicate and tough materials with equal precision.



Inspecting cylinder finning tools in the Wood-Ridge plant of the Wright Aeronautical Corporation. Photograph courtesy the Wright Aeronautical Corp.

Cool Millions WITH THE HELP OF JONES & LAMSON *Optical Comparators*

This book "Beyond a Shadow of a Doubt" will tell you more about our Optical Comparators and what they are doing.

Proper dissipation of millions of heat units from the cylinders of the 2200 H.P. Wright Cyclone 18's that power the B-29 Superfortress, depends upon the perfection of the cylinder fins. To be sure that these fins are accurate —beyond a shadow of a doubt—the tools that cut them from solid metal are inspected on Jones & Lamson Optical Comparators.

Quality control by the inspection of tools, parts and products, with Jones & Lamson Optical Comparators, is an accurate, rapid process. Objects that require hours to inspect by other means can be inspected in minutes, or even seconds.

JONES & LAMSON
MACHINE COMPANY
Springfield, Vermont, U.S.A.

Manufacturer of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers.

Assembly Line . . . STANLEY H. BRAMS

• Rated machine tool orders for automotive needs are entered, but delivery dates will be unavailable until the builders clear out the cancellations accrued from arms cutbacks . . . Outlook for automotive steel is improved.

DETROIT—The problems of reconverting to automobile production are being discussed and acted on, one after another, by cooperating industry and government groups. It is quite obvious that Washington wants the auto industry to be ready to go with the least amount of employment dislocation, and that attitude is leading to definite progress.

Considerable work is being done on the machine tool situation. An early move by WPB was to complete a canvass of the automobile companies to see whether their minimum requirements, as presented early in April, could not be further reduced. Several hundred machines were cut off the list, bringing the total down to around 4000. In making this checkup, however, it was found that previous estimates of dollar value were somewhat low, and so little disarrangement of business expectations dollarwise has taken place.

These findings have all gone to Washington, and approval for the machines has since come back to the companies with AA-3 rating attached. This rating has been filed by most companies with machine tool suppliers as an amendment to the orders placed earlier. In some cases this has resulted in an indicated better delivery date, but as more rated orders have come in, it has, about equally as often, put promises back. However, there is no clear-cut picture on the effectiveness of the AA-3 rating as yet, because many major machine tool builders have found their order boards so clogged by recent cancellations growing out of curtailed ammunition, tank and aircraft programs that they will be unable for another week or so to determine exactly what their order situations are. As was said here last week, a few machine tool companies appear to have less than a month's backlog of business on their books.

New machine tools are one thing, and recapture of company-owned machines in arms production is another. It has been maintained by industry spokesmen that about 100,000 or 150,000 privately-owned pieces of government service must be returned to the use of the companies before they can go ahead on even limited auto output. In an effort to speed this desired end, an industry committee has held two meetings in recent weeks, and is in process of drafting a program to be submitted to WPB as a recommendation for action. Basic among the viewpoints of this committee and the industry at large is that events have proven again the validity of the contention first advanced a year ago, that where government equipment is surplus or idle it should be substituted for company-owned machines, either by physical transfer or by trade.

To gain this end, a number of directives must be eliminated, and the industry committee is looking these over to determine which must go. For example, one ruling provides that no military equipment can be installed in a plant where company equipment on hand can do the job. This was a splendid ruling during the transition to war economy, but is a stumbling block in the way of reconversion now.

THE committee undoubtedly will also seek to outline ways and means of speeding up transfers of government machinery into private hands. As matters stand at the present time, facilities now used for war work can be sold to the contractor on the basis that they be continued in arms production as long as needed. This has not proved satisfactory to either the military or the private contractors, say industry sources. On its side, industry is chary of buying machines which may be indefinitely unavailable for their wants because of changing and renewed war requirements. (There are exceptions to this general feeling, however; only a few weeks ago Buick bought about $700,000 worth of machines from the Melrose Park, Ill., plant it operates.) On their side, the military people are reluctant to sell machines they may need later, and some quarters profess to see the proof of this contention in the fact that the farther away from a contract completion a machine is, the more readily the services are willing to talk about selling it; while the nearer contract windup comes—bringing closer the end of military control over machines which might be sold—the less willing are the services to discuss selling.

What the industry wants to do and will undoubtedly ask ways and means of doing, is to obtain speeding of the process by which sales to a contractor can be made—and delivery completed—of equipment in his plant. The whole surplus machinery disposal problem will undoubtedly be called up for airing in this recommendation. What the industry wants to know is why, with 35,000 to 50,000 machine tools now said to be surplus, no such quantity appears on RFC listings of the sort, nor can details be obtained on the items lacking.

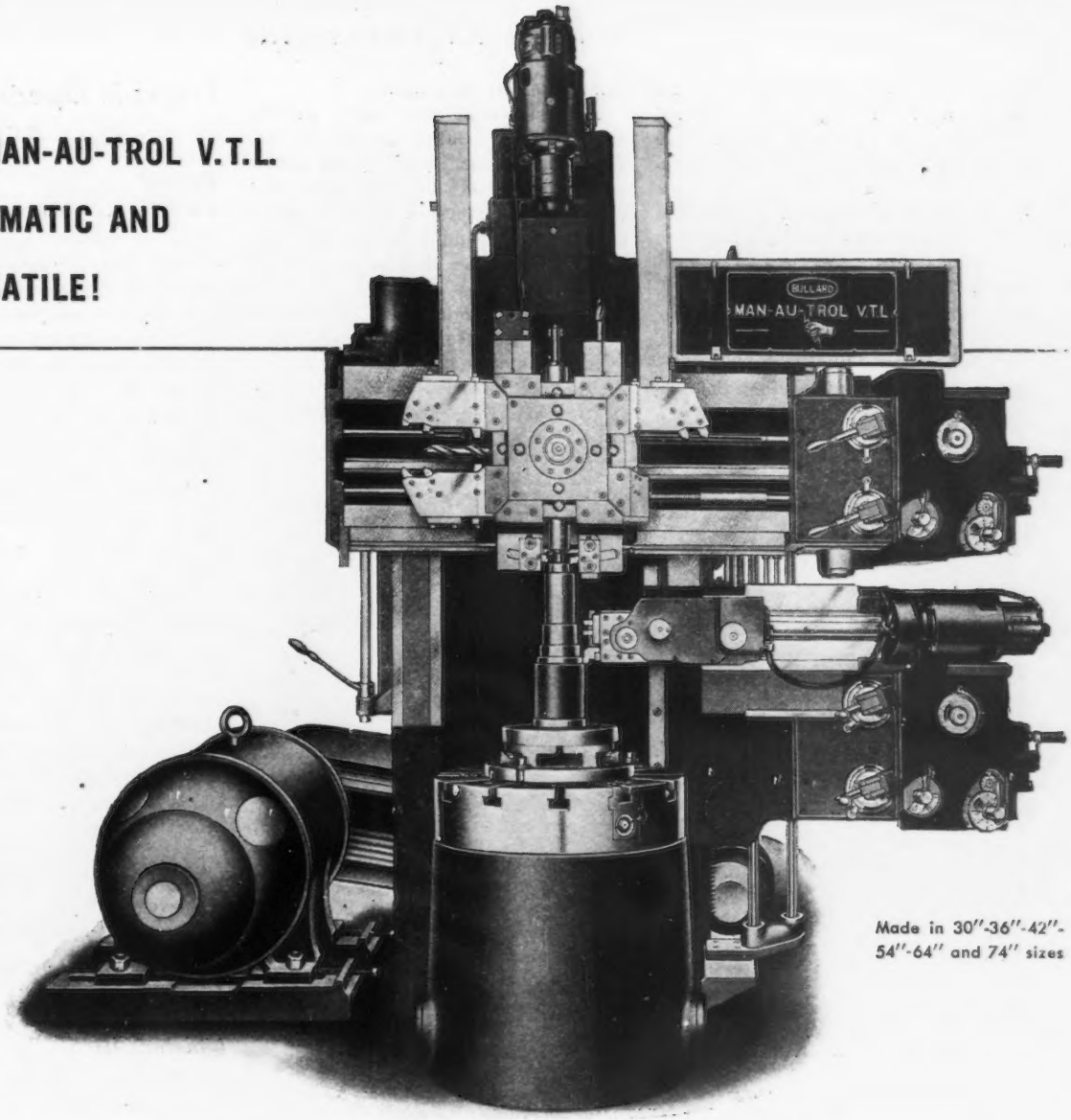
The auto companies meanwhile have run into a regulation shadowing their plans of circulating lists of critical machine tools among themselves. It was planned that each manufacturer would compile a list of machines for which delivery prospects seem dim today, then send these to other companies as a means of uncovering surpluses in their wanted categories. However, Ordnance and Air Force regulations prohibit divulging of such information. So elimination of these rules will likely be sought.

ALONG with machine tools, materials were also on the past week's agenda for discussion and analysis.

On the question of steel, no problems of consequence are anticipated. Belief is now being expressed that somewhere more than 3,000,000 tons of steel will be available in the first quarter after VE-Day. Of this, the industry is expected to be allocated to start out on production, and subsequent stocks will be enough to meet requirements.

No stainless steel is expected for the immediate forward period, and

BULLARD MAN-AU-TROL V.T.L.
100% AUTOMATIC AND
100% VERSATILE!



Made in 30"-36"-42"-54"-64" and 74" sizes

Made possible by MAN-AU-TROL . . .
The automatic control that is as versatile as manual control

This new Bullard MAN-AU-TROL V.T.L. does *automatically* any and every job (involving up to 40 functions of the Main Head and 40 additional functions of the Side Head) that a manually-operated vertical turret lathe can do. Does it faster to a degree of repetitive accuracy no man can match. Cuts down setup time from one class of work to another . . . without cams or similar wearable parts. Can be converted instantly to manual operation on any entirely different piece without disturbing the automatic setup of the MAN-AU-TROL. All the while — the operator supervises production.

Think what this means to you. With a Bullard MAN-AU-TROL V.T.L. you can economically machine long runs or single units . . . can protect yourself against changes in specifications . . . can give yourself a tremendous cost advantage in competitive markets.

For complete details, write today for new bulletin on the new Bullard MAN-AU-TROL V.T.L. The Bullard Company, Bridgeport 2, Connecticut.

BULLARD MAN-AU-TROL
MASTER OF THE MACHINE

BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

there is some possibility that all bright work on cars will be limited for a time. But the car makers have been told that they will be able to go back to the use of full alloy steels where they desire them for engine parts, rather than be forced to use the lean alloy NE grades. This switch is expected as of VE-Day. Likely most specifications will return to the SAE standards, although a few NE series, like the 8600-8700 group, have been satisfactory enough to many users during the war period and are likely to continue in demand.

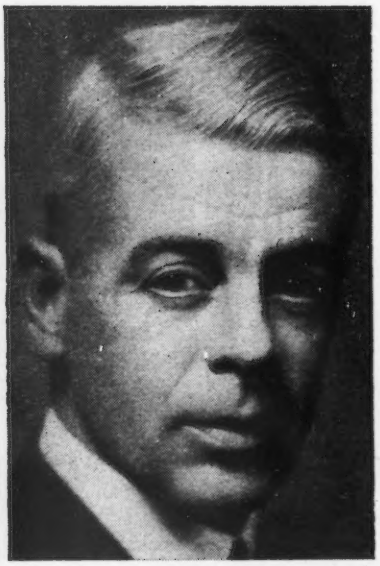
A considerable tonnage of orders has been placed during April for automotive sheet and other steel. Total bookings may now exceed 300,000 tons. This is on the same basis as the orders placed last summer when reconversion fever was hot, as now—calling for delivery of specified tonnage in successive weeks after go-day. Current orders on file begin with deliveries within a week or two in some instances after go-day, but these initial requirements will be largely for forgings and machined pieces which must be started well ahead of final assembly operations.

Also placed as new orders on this same basis is a large amount of steel for replacement parts of all kinds, particularly body sections, like fenders. Cold rollers in Detroit which process billets and slabs for the auto factories are also understood to be in the market.

A far cry from steel, textiles are the most worrisome car component today. As a matter of interest, it should be recorded that a textile meeting last week heard the industry tell WPB exactly what its average requirements of fabrics are for automobiles. The totals are definitely surprising—around 56 yd. of assorted widths per car.

On a basis of 1000 cars, the industry reported need for these quantities: Flatcloth (broadcloth), 4736 yd. or mohair, 3794 yd.; headlining, 3560 yd., carpeting, 2318 yd., cotton sheeting, 4761 yd., burlap, 16,679 yd., osnaburg, 2402 yd., tobacco cloth (cheap cotton), 4184 yd., coated fabrics (artificial leather, etc.), 2824 yd., laces and bindings 19,548 yd. In addition, 1395 sq. ft. of hides are required per 1000 cars.

CHARLES E. WETHERALD



HUGH DEAN

CHANGES: *Retirement of Charles E. Wetherald, general manufacturing manager of Chevrolet, and appointment of Hugh Dean, previously his assistant, to take his place, was announced this week by M. E. Coyle, general manager of the General Motors Division. Wetherald, who assumed his present position in 1931, has completed 30 years of service with Chevrolet and became associated with General Motors and its predecessor companies in 1904, when he joined Buick. He was one of the original incorporators, in 1911, of Mason Motor Co., later merged with Chevrolet. Dean joined Buick in 1915 as a laborer, and came to Chevrolet in 1923. He was appointed assistant to Wetherald in 1933, and during the war has been in charge of aircraft engine production.*

Trucks in Operation Show Slight Decline

Detroit

• • • **Trucks and commercial** vehicles in operation in this country during 1944 declined only 3.48 per cent from the total operating in 1941, R. L. Polk & Co., reported in making public its compilation of truck registration since the start of the war.

Last year's registrations in the commercial category totaled 4,393,329 units against 4,551,726 in 1941. This is considerably less than the decline in passenger car registrations for the same wartime period, 24,048,711, against 27,700,011 in 1941.

Partially due to continued small manufacture of civilian trucks, 21 states increased the number of vehicles in operation over 1941. These included North Dakota, Arkansas, Idaho, North Carolina, Oregon, South Carolina, West Virginia, Wisconsin and others. Largest losses were suffered in the District of Columbia, Indiana, Louisiana, Maryland, Massachusetts, Missouri, Texas and other states. The general effect was a shift of the truck population southward and westward.

Nash Plant Increases Propeller Schedules

Lansing, Mich.

• • • **Schedules at the** propeller plant of Nash-Kelvinator Corp. here have been increased to supply a number of important aircraft, thus compensating for cutbacks growing out of the forthcoming elimination of B-24 bomber production at Willow Run.

The B-24 supply work represented about 20 per cent of Nash-Kelvinator's total output here, and would have resulted in layoffs for about 1000 workers had not letters of intent been obtained immediately.

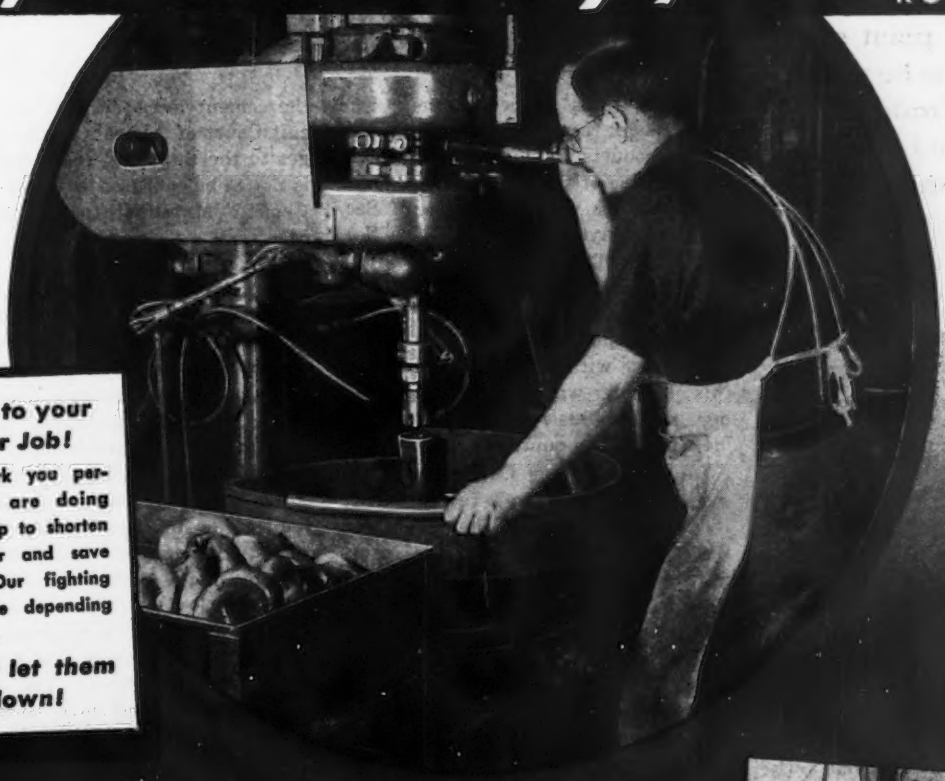
Ammunition Contract Placed

New Castle, Ind.

• • • **Despite recent cutbacks in** ammunition, the local plant of Dodge Division of Chrysler Corp. has just gone into production of a new contract for 20 mm. armor piercing shot.

Output is currently at the rate of half a million pieces per month. The new job was scheduled this year, a few months after completion of another ordnance job calling for 20 mm. high explosive projectiles.

"Taps that Fill the Gaps" ...AND KEEP PRODUCTION ROLLING!



Size of Thread being tapped, 1-31/32"—16 NS; length of Thread, 1½". Number of pieces per hour off drill press—40. Number of pieces per hour in hand operation for hand sizing—20. Photographs permitted by courtesy of Miller Mfg. Co., Detroit.

Stick to your War Job!

The work you personally are doing may help to shorten the War and save lives. Our fighting men are depending on you.

Don't let them down!

MURCHEY

SOLID ADJUSTABLE TAPS

TYPE "E" FOUR CHASERS • TYPE "R" SIX CHASERS

Sometimes a machine does not permit the use of a collapsible tap. Sometimes space is too limited. Sometimes sizing operations are required. When such circumstances arise, MURCHEY SOLID ADJUSTABLE TAPS solve the problem. Although not equipped with collapsing devices, they nevertheless have all the other advantages of a collapsible tap. They fill the gap between collapsible and solid taps. *Being adjustable,* correct decimal size is always maintained. Inserted chasers are readily removed for resharpening. Once you purchase the tap body, you can obtain a wide variety of thread sizes merely by purchasing other chasers. The chasers, which are less expensive than solid taps, may be replaced when necessary. Write for complete descriptive literature.

MURCHEY MACHINE & TOOL CO.

Detroit 26, Michigan

Murchey manufactures all types of Collapsible Taps, Self Opening Die Heads, Thread Milling Machines and Shell Tapping Machines. Write for catalogs. Address Dept. I.

MURCHEY

Washington . . . L. W. MOFFETT

• Test of legality of multiple basing point system remains to be made . . . Federal Trade Commission elated at glucose case and is expected to go after steel basing point setup.

WASHINGTON — Test of the legality of the multiple basing point pricing system, such as that used by the iron and steel industry, remains to be made. The Federal Trade Commission, traditional crusader against basing point systems, is going to see to that.

It was by no means disposed of by the two recent related decisions in the Corn Products Refining Co. and the Staley Mfg. Co., makers of glucose corn syrup. Those cases definitely knocked out as illegal the single basing point system. The court approved a Federal Trade Commission finding that it violated the Clayton Act clause (Sec. 2) prohibiting discrimination in price.

The commission hailed the opinions enthusiastically. It issued a statement saying that they appear to be a confirmation of its "condemnation of the practice in its famous Pittsburgh plus case against the U. S. Steel Corp. and also provides a new instrument for dealing with the problem of monopoly and monopolistic pricing practices."

It may well be that the test of the legality of the multiple basing point system will grow out of this ancient case. Its vintage is seen by the fact that the commission issued its complaint in this case on April 26, 1921. On July 21, 1924, it issued an order, the first of its kind, requiring the Steel Corporation and its subsidiaries to cease and desist from the sale of their rolled steel products on the Pittsburgh-plus price system. The commission, as pointed out in the Corn Products Refining decision, held that the use of the single basing point at Pittsburgh was a violation of Sec. 2 of the Clayton Act as well as Sec. 5 of the FTC Act, which prohibits unfair methods of competition. The Steel Corporation on Sept. 16, 1924, filed a formal statement of intended compliance with the order. But since this old order was issued, the expanding steel industry has established multiple basing points.

In 1938 the Steel Corporation filed a petition asking for a review of the FTC order, supporting its request on the changed conditions in the industry through the development of multiple basing points. The commission has pending in the Circuit Court of Appeals in Philadelphia, a motion to strike out a portion of the Steel Corporation's petition relating to changed conditions and a hearing on this motion has been set for the middle of May. This case may reach the Supreme Court as the first of the kind for a decision regarding the legality of the multiple basing point system. It may be, however, that a like case which the FTC has against the cement industry, now in the Circuit Court of Appeals in Chicago, will get to the Supreme Court first. This is not to be confused with the original Cement Manufacturers' Association case.

A MEMBER of the FTC staff, in commenting on the Supreme Court decisions of April 23, said that rather than weakening the commission's position in multiple basing point cases, it is strengthened. He said that it is the commission's position that all basing point systems involve price discrimination and that the multiple basing point system in heavy industries such as steel and cement, because of the high freight costs, violates the law and "substantially lessens competition" even more than a single basing point system when used by lighter industries. The FTC, in a word, is sticking to its original insistence on f.o.b. mill pricing.

The court through Chief Justice Harlan F. Stone, in the Corn Products and Staley cases, made it clear that it was not passing upon the legality of the multiple basing point system. Rather, in making sharp distinctions between the two systems, it made

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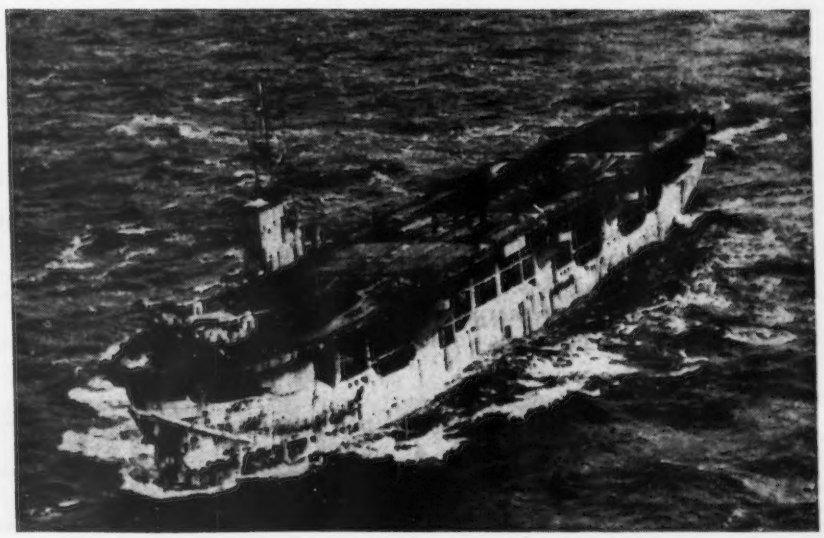
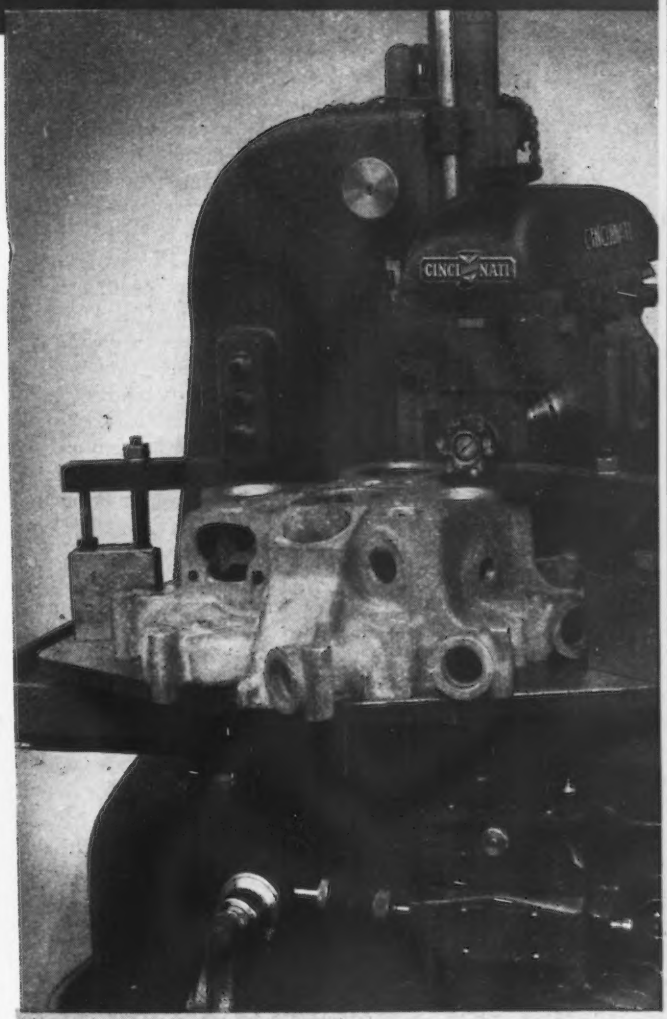
AIRCRAFT CARRIERS—*A number of British merchant ships have been equipped with flight decks for the launching and landing of aircraft. These Merchant Aircraft Carriers are unique in that they combine the functions of merchantmen with those of miniature escort carriers. Even the largest MAC ship is considerably smaller than the smallest aircraft carrier. Shown here is the British ship Aneylus.*



CUTTER HEAD RAISES *Automatically*

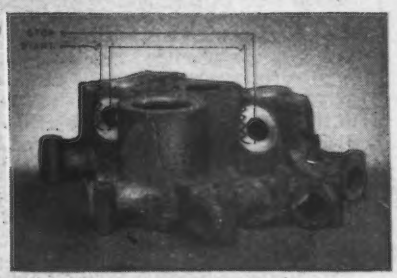
allowing OBSTRUCTION to pass

In addition to automatic table feed cycles, the CINCINNATI No. 2-24 Automatic Rise and Fall Milling Machine offers this important advantage: *down feed of the cutter head, synchronized with the table feed cycle.* This extra feature is especially useful where there is an obstruction between milled surfaces such as the bulge in the crankcase casting between the two milled pads, as shown in the illustration below. Special equipment to handle this job included: fixture, cap type arbor support to fit over extended shell end mill, and special cycle selector to mill down in two accurately located positions of table. ¶ This setup was developed by the CINCINNATI Application Engineers who will be glad to discuss your milling problems with you in an endeavor to work out a more accurate or more economical way of handling them.



Above Right: *Milling two pads on rear crankcase for aircraft engine. The machine is a* CINCINNATI *No. 2-24 Automatic Rise and Fall Miller. After loading the fixture, the operator merely flips the starting lever and nine functions of the milling cycle follow automatically, including return of the table to the starting position.*

Illustrated at the right is a close-up of part being milled on the equipment shown in the photograph above. Also shown is a diagram of the automatic cycle.



Here are the nine automatic steps in the cycle:

START CYCLE.

1. Table rapid advances and cutter starts.
2. Table feeds to accurate cutting position.
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4. Cutter head rapid returns to top of stroke.
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CINCINNATI

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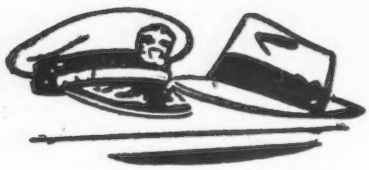
THE CINCINNATI MILLING MACHINE CO. CINCINNATI, 9 OHIO, U.S.A.

TOOL ROOM AND MANUFACTURING MILLING MACHINES... SURFACE BROACHING MACHINES... CUTTER SHARPENING MACHINES

Washington . . . .

L. W. MOFFETT

• Test of legality of multiple basing point system remains to be made . . . Federal Trade Commission elated at glucose case and is expected to go after steel basing point setup.



WASHINGTON — Test of the legality of the multiple basing point pricing system, such as that used by the iron and steel industry, remains to be made. The Federal Trade Commission, traditional crusader against basing point systems, is going to see to that.

It was by no means disposed of by the two recent related decisions in the Corn Products Refining Co. and the Staley Mfg. Co., makers of glucose corn syrup. Those cases definitely knocked out as illegal the single basing point system. The court approved a Federal Trade Commission finding that it violated the Clayton Act clause (Sec. 2) prohibiting discrimination in price.

The commission hailed the opinions enthusiastically. It issued a statement saying that they appear to be a confirmation of its "condemnation of the practice in its famous Pittsburgh plus case against the U. S. Steel Corp. and also provides a new instrument for dealing with the problem of monopoly and monopolistic pricing practices."

It may well be that the test of the legality of the multiple basing point system will grow out of this ancient case. Its vintage is seen by the fact that the commission issued its complaint in this case on April 26, 1921. On July 21, 1924, it issued an order, the first of its kind, requiring the Steel Corporation and its subsidiaries to cease and desist from the sale of their rolled steel products on the Pittsburgh-plus price system. The commission, as pointed out in the Corn Products Refining decision, held that the use of the single basing point at Pittsburgh was a violation of Sec. 2 of the Clayton Act as well as Sec. 5 of the FTC Act, which prohibits unfair methods of competition. The Steel Corporation on Sept. 16, 1924, filed a formal statement of intended compliance with the order. But since this old order was issued, the expanding steel industry has established multiple basing points.

In 1938 the Steel Corporation filed a petition asking for a review of the FTC order, supporting its request on the changed conditions in the industry through the development of multiple basing points. The commission has pending in the Circuit Court of Appeals in Philadelphia, a motion to strike out a portion of the Steel Corporation's petition relating to changed conditions and a hearing on this motion has been set for the middle of May. This case may reach the Supreme Court as the first of the kind for a decision regarding the legality of the multiple basing point system. It may be, however, that a like case which the FTC has against the cement industry, now in the Circuit Court of Appeals in Chicago, will get to the Supreme Court first. This is not to be confused with the original Cement Manufacturers' Association case.

A MEMBER of the FTC staff, in commenting on the Supreme Court decisions of April 23, said that rather than weakening the commission's position in multiple basing point cases, it is strengthened. He said that it is the commission's position that all basing point systems involve price discrimination and that the multiple basing point system in heavy industries such as steel and cement, because of the high freight costs, violates the law and "substantially lessens competition" even more than a single basing point system when used by lighter industries. The FTC, in a word, is sticking to its original insistence on f.o.b. mill pricing.

The court through Chief Justice Harlan F. Stone, in the Corn Products and Staley cases, made it clear that it was not passing upon the legality of the multiple basing point system. Rather, in making sharp distinctions between the two systems, it made

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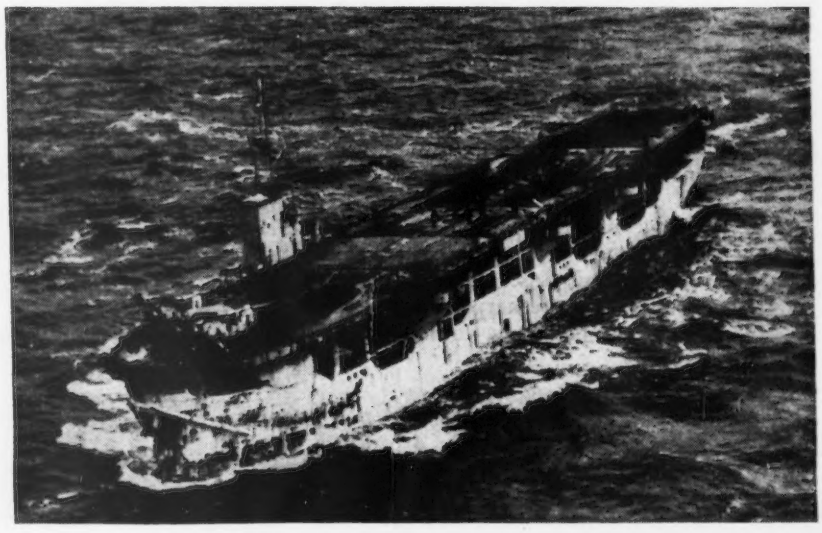
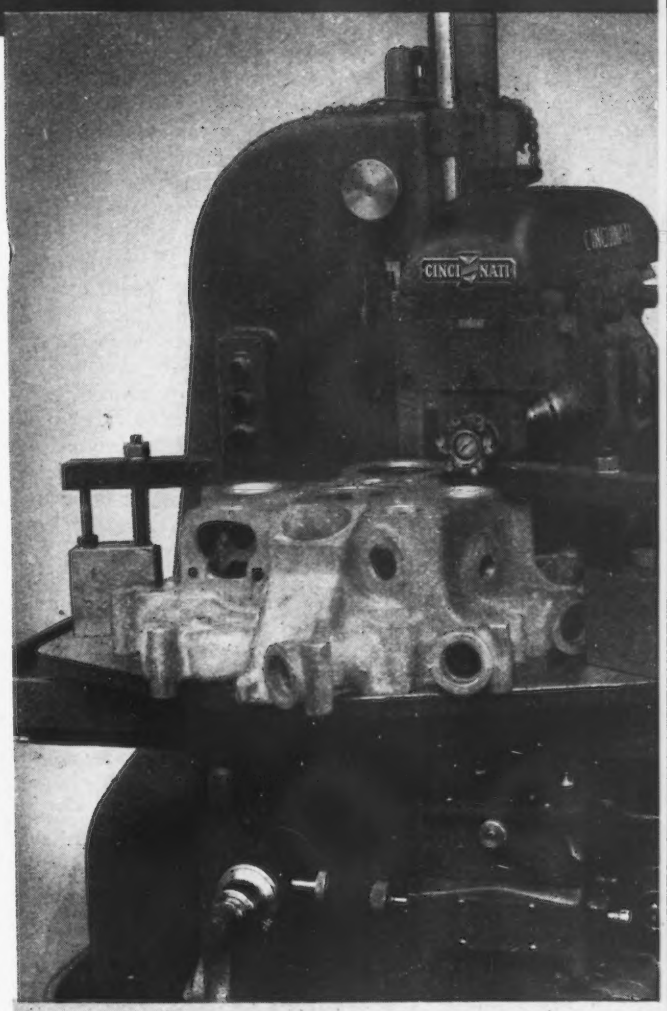
AIRCRAFT CARRIERS—*A number of British merchant ships have been equipped with flight decks for the launching and landing of aircraft. These Merchant Aircraft Carriers are unique in that they combine the functions of merchantmen with those of miniature escort carriers. Even the largest MAC ship is considerably smaller than the smallest aircraft carrier. Shown here is the British ship Aneylus.*



CUTTER HEAD RAISES *Automatically*

allowing OBSTRUCTION to pass

In addition to automatic table feed cycles, the CINCINNATI No. 2-24 Automatic Rise and Fall Milling Machine offers this important advantage: *down feed of the cutter head, synchronized with the table feed cycle.* This extra feature is especially useful where there is an obstruction between milled surfaces such as the bulge in the crankcase casting between the two milled pads, as shown in the illustration below. Special equipment to handle this job included: fixture, cap type arbor support to fit over extended shell end mill, and special cycle selector to mill down in two accurately located positions of table. ¶ This setup was developed by the CINCINNATI Application Engineers who will be glad to discuss your milling problems with you in an endeavor to work out a more accurate or more economical way of handling them.



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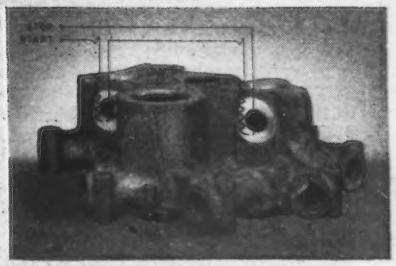

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points that were interpreted to be to the advantage of the multiple system. But it did not pass on its merits for the simple reasons that they were not at issue in the cases before the court.

The court's distinctions between the single and multiple basing point systems were made in rejecting a contention of the Corn Products Refining Co. In arguing that the single basing point system is legal, the company pointed to Supreme Court decisions in the cases of the Maple Flooring Association and the Cement Manufacturers' Association. These suits, in which the court found for the two associations and their clientele of manufacturers, charged restraint of trade under the Sherman Act and did not involve the prohibition of the Clayton Act upon price discriminations. The court pointed out that the only question for decision in these cases was whether there was a concerted price fixing scheme among competing sellers, accomplished in part by their adoption of a basing point system.

MOREOVER, the court said that basing point systems involved in those cases were quite unlike that used by the Corn Products Refining Co. In the Maple Flooring case, it was pointed out, the single basing point was so close to most of the points of production as to result in trivial freight variances; and the defendants in that case were willing to sell on an f.o.b. mill basis, whichever the purchaser so requested. In the Cement case the defendants used a multiple basing point system, with a basing point at or near each point of production.

"Under this system, any manufacturer in order to compete in the territory closer freightwise to another, would absorb freight by adjusting his mill price to make his delivered price as low as that of his competitors," said the court in describing a system that prevails in the iron and steel industry. "Under this system the delivered price for any locality was determined by the nearest basing point. We have no occasion to decide whether a basing point system such as that in the Cement case is permissible under the Clayton Act, in view of 2b (Clayton anti-price discrimination provision) permitting reductions in price in order to meet a competitor's equally low price."

Despite the FTC's insistent drive for an f.o.b. plant pricing system, the court apparently is holding out against it unless there is an improbable clarifying legislation requiring such a sweeping change in marketing the nation's products. This was apparently implied in its comment that the Corn Products Refining Co. had argued that rejection of a provision of the Robinson-Patman Bill, which would have in effect prohibited all basing point systems, has indicated its intention to sanction all such systems. The court pointed out that the practical effect of this provision would have been to require that the price of all commodities sold in interstate commerce be computed on an f.o.b. factory basis in order to avoid the prohibited discriminations in selling price. Indeed, said the court, the provision would have prohibited the multple basing point system as that of the Cement Manufacturers' Association case, which the Supreme Court had previously dismissed.

The court not only reflected its awareness of the sweeping change in the pricing method that a uniform f.o.b. plant system would involve, but expressed the view that Congress had turned thumbs down on such a system. At the same time it gave the opinion that Congress has left the question of the legality of the basing point system to be determined as they concern Sec. 2 (a) of the Clayton Act.

"Such a drastic change in existing pricing systems, as would have been effected by the proposed amendment, engendered opposition which finally led to the withdrawal of the provision by the House Committee on the Judiciary," said the court. "We think this legislative history indicates only that Congress was unwilling to require f.o.b. factory pricing and thus make all uniform delivered price systems and all basing point systems illegal per se. On the contrary we think that it left the legality of such systems to be determined accordingly as they might be within the reach of Sec. 2 (a) (of the Clayton Act) as enacted, and its more restricted prohibitions of discriminations in delivered prices."

THE BULL OF THE WOODS — BY J. R. WILLIAMS

"JUST NAPPIN'!" DON'T HAND ME THAT-- IF THAT'S SO, A SURGEON COULD PERFORM A MAJOR OPERATION ON YOU WHEN YOU WAS JUST TAKIN' A NAP! A HOT CHIP GOIN' COMPLETELY THRU YOU AIN'T NO MINOR OPERATION, SO DON'T LEAN ON THAT MACHINE --FER TH' WAR'S SAKE!
IT WENT IN HIS NECK AN' COME OUT HIS PANTS LEG--I THINK HE MUSTA GOT SOME ETHER SOMEWHERES!
HE SHOULD BE BURIED, BUT YOU CAN'T BE INHUMAN--AND I STILL DON'T KNOW WHAT THAT MEANS!
J.R WILLIAMS
5-4
THE LEANER
COPR. 1945 BY REA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

Copper Plated Tubing Surplus Offer by RFC

New York

• • • A large quantity of special tubing manufactured by the Bundy Tubing Co. of Detroit is offered for sale by the Surplus Property Division of the New York Loan Agency of RFC. This tubing is 0.248 in. o.d. by 0.128 in. i.d., 16 gage steel, SAE 1010, copper plated inside and outside and cold drawn to size. Made for bullet cores, this tubing is now obsolete because of changed plans. The tubing is in lengths of 10 or 12 ft.

Diamond-impregnated Carboloy Wheel Dressers give top performance—at low cost per dressing—on all wheels in common use today. No time out for remountings! Just a quarter turn daily of dresser in holder presents new cutting surface throughout life of dresser. No diamond loss! They *can't* come loose in *this dresser*, because each diamond is held securely throughout its life in a special matrix. That's why you get *extra* dressing from each carat of diamonds—close to 100% utilization of *every* diamond.

Three dresser sizes, for rough, semi-finish, and finish grinding. Price $9.60 to $15.35. Write for leaflet SA-127.

CARBOLOY

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WRITE FOR BOOKLET SA-127

WHEEL DIAMOND IMPREGNATED DRESSERS

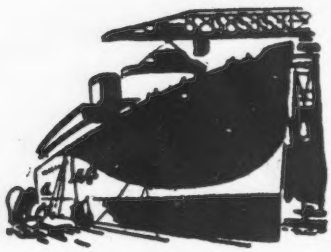
CARBOLOY COMPANY, INC., 11153 E. 8 MILE STREET, DETROIT 32, MICHIGAN

CHICAGO • CLEVELAND • HOUSTON • LOS ANGELES • MILWAUKEE • NEWARK • PHILADELPHIA • PITTSBURGH • THOMASTON

West Coast . . .

OSGOOD MURDOCK

• Stunned by Conference jitters, dazzled businessmen in California try to further ponder Mr. Bain's information circular on the West Coast steel problems.



SAN FRANCISCO—Dazzled and distracted by the presence of official delegates from 46 more or less soverign nations accompanied by several thousand camp followers, and hounded by thousands of assorted sightseers and proponents of sundry causes, the ordinary citizens and plain businessmen and women of this community this past week have passed from states of pride into virtual conference jitters.

Men are away from their offices assisting in hospitality, trying to arrange for the accommodation of visiting firemen, futilely attempting to secure tickets or credentials for those imperious friends and customers who simply will not take no for an answer, or otherwise seeking to accommodate themselves and their friends to these strange circumstances. Taxpayers can't reach the City Hall, in the well-guarded and isolated Civic Center, to pay their taxes. Visiting professional ball players in the Pacific Coast League sleep on cots in the dressing room at the ball park. Volunteer A.W.V.S. society women prepare and serve a thousand lunches daily in the basement of the Civic Opera House to the official delegates and their staffs. Escort sirens blare in the streets, anti-aircraft guns peek from the roofs of buildings and general conditions are in no way favorable for the conduct of ordinary business or the summation of the week's development in steel and industry.

THAT comprehensive and level-headed 35-page "Information Circular" issued by the Bureau of Mines last month entitled "A Pattern for Western Steel Production" by H. Foster Bain, consulting engineer, is an important contribution to the already fat and diverse mass of data on this general subject. Mr. Bain was for a number of years with the bureau on the West Coast during the calm and provincial days before the war and then spent a number of years in the Philippines where he organized a Bureau of Mines for the Philippine Commonwealth Government. Interned in Manila, he returned on the second voyage of the *Gripsholm* and it is understood that he was brought into the bureau at Washington a year ago at the special request of Secretary Harold Ickes for this particular project.

Commenting on raw materials, he points out that known and prospective reserves of iron ore in the western states are "distinctly small compared with those in other producing regions of the United States." He cites E. F. Burchard's figures from the Federal Geological Survey that the iron ore reserves of the western states are as follows: Measured and indicated, 141,050,000 tons; inferred, 272,612,000 tons; potential, 141,197,000 tons; maximum total, 554,859,000 tons. Up to the end of 1943 total production has been 38,200,000 tons. Compared to the northeastern states, Ohio, Pennsylvania, New Jersey, New York and New England, this is but 25 per cent of their total measured and indicated, preferred and potential, 2,390,736,000 tons, of which total production to the end of 1943 has been 162,000,000 tons. It is only fair to point out, however, that potential and possible bodies of major importance may be added to the western reserves as a result of current and immediately prospective exploration and development. With only one little blast furnace up to two years ago, there was neither incentive nor demand for the intensive and extensive exploration of ores now in progress.

With reference to the controversial possibility of applying the sponge iron direct reduction process in the Far West, on which subject the Bureau of Mines has, in the past, tended to be open-minded to the point of optimism, Mr. Bain cites "an old though hard rule of economics in technology that high-grade products cannot be made from low-grade materials except at higher cost. . . . In the case of sponge-iron plants that have been operated or have passed beyond the pilot-plant stage, it has so far proved true that there is a disappointingly high portion of intermediate product that must be returned to the furnace. The economy of operation has also yet to be proved, since few plants have been run beyond the experimental stage."

In the far western area the U. S. Bureau of Mines has recently established divisional offices and appointed separate chiefs in each for mining and metallurgical departments, as follows: At Salt Lake, S. R. Zimmerley, metallurgical; P. T. Allsman, mining. At Boulder City, Nev., C. W. Davis, metallurgical; A. C. Johnson, mining. At Tucson, Ariz., Paul M. Ambrose, metallurgical; J. H. Hedges, mining.

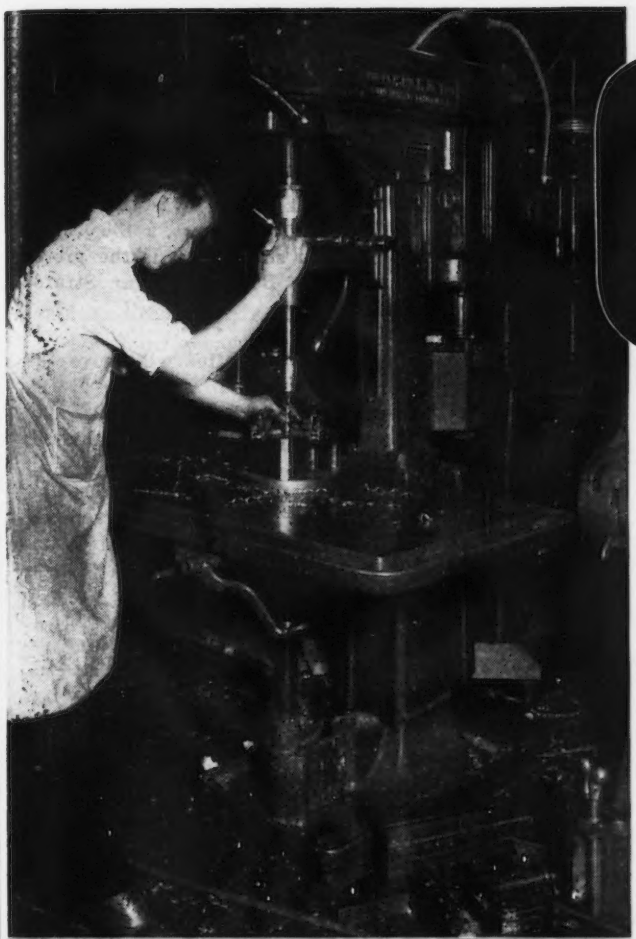
Mahoney Appointed

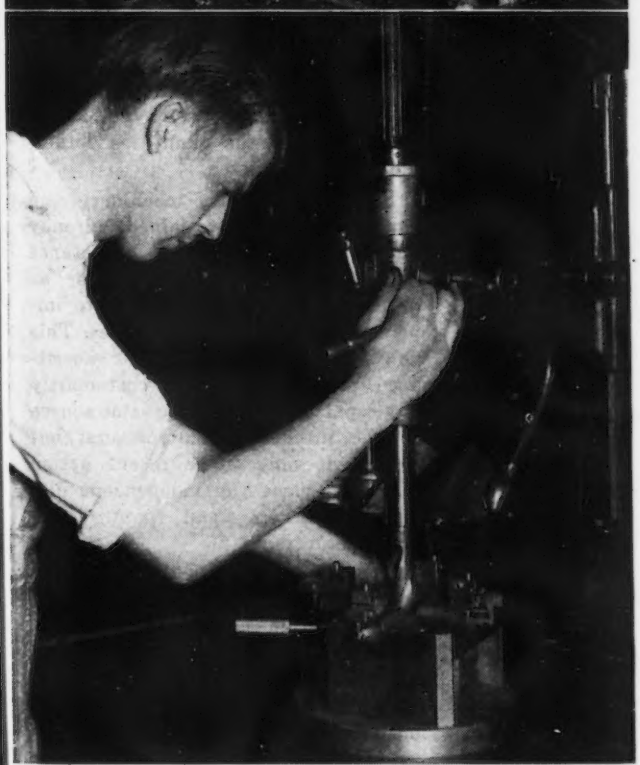
Washington

• • • Dr. J. R. Mahoney, Salt Lake City, Utah, Professor of Economics and Director of Economic Research at the University of Utah, has been appointed by the Surplus Property Board to make studies of economic and marketing problems of government-owned steel plants. Samuel Moment, Portland, Ore., has been loaned to SPB by the Bonneville Power Administration and been appointed to make similar studies with respect to the more than 50 government-owned aluminum plants costing $700,000,000.

The studies have already started and when completed will be considered by the board as its basis for its program of plant disposal. Dr. Mahoney has made intensive studies of the nation's mineral resources as well as of the steel industry in all of its branches, particularly with regard to the government owned plants in Geneva, Utah.

Since 1939, Mr. Moment has supervised investigations on marketing problems affecting Bonneville sales to chemical and aluminum plants. Previously his investigations included one of the copper industry for the Senate's temporary National Economic Committee.





FOSDICK *High Speed* DRILLS

● Batteries of these FOSDICK High Speed Sensitive Drills are in use throughout the nation. In use as single units and arranged in gangs with a common table —these machines are doing a lot of drilling, reaming and tapping operations rapidly and with a minimum of cost.

Shown is a FOSDICK Model 5 BM—drilling work being held in a simple fixture. After drilling the small hole, the fixture and work are shifted to a second machine where a second and larger hole is drilled.

FOSDICK High Speed Drillers have a wide range of spindle speeds — have ample power for drilling steel as well as cast iron—and may be furnished with either hand or power feed. An average operator can easily maintain a high production rate.

Where versatility and high production are required on holes up to 1½" diameter, investigate the FOSDICK High Speed Drill. Complete details are available in our High Speed Drill Bulletin HSI.

Write for yours.

ARMY E NAVY

FOSDICK MACHINE TOOL COMPANY
CINCINNATI 23, ··· OHIO

At Albany, Ore., Dr. B. A. Rogers, metallurgical; S. H. Lorain, mining.

AS the new coastwide committee of independent fabricators and regional industrial representatives holds its first meeting at Los Angeles, May 10, to tackle the ticklish subject of a revised Pacific Coast basing point and reduced differential in the cost of raw steel at Pacific Coast ports, speculation grows as to the avenue of approach. Since both the Geneva and Fontana plants are primarily flat product rolling mills, it has been suggested that first consideration might well be given to a postwar delivered price on plates and hot rolled sheets, to be effective, perhaps, six months or a reasonable time after VE-day. With tentative commitment on even these two products, on which differential adjustments for tin plate, corrugated and galvanized sheets might follow, fabricators and processors would be in position to plan their postwar products. It is increasingly apparent to thoughtful students of postwar economics of heavy industry on the West Coast that a delivered price on flat rolled mill products at Pacific ports in the neighborhood of $46 a ton might well encourage sufficient additional volume and processing production to tempt and even assure the operation of the greatly expanded mill facilities in this area.

* * *

At Los Angeles Consolidated Steel Co. has announced that full operating levels will be maintained well into 1946 at its Los Angeles Harbor yards. Still to be produced are 47 AV-1 coastal cargo vessels at a cost of approxiately $90,000,000. These ships are 324 ft. long with 50 ft. beam, rated at 5010 deadweight tons. Following completion of the AV-1's, construction will be underway on 16 C-2's for the Maritime Commission at a cost of over $70,000,000. These are special duty ships for the Pacific War zone, 459 ft. long, with 63 ft. beam and of 9643 deadweight tons. Consolidated has built a diversified armada of more than 1500 vessels of various types since the beginning of the war and is converting its Pico Street outfitting yard in Long Beach to ship repair work to complement repair operations at its new Terminal Island ship repair division. A 14,000 ton floating dry dock is to be installed at its Wilmington shipyards which will be converted to the repair of all types of vessels.

* * *

General Motors has been authorized to proceed with a $1,264,000 project for restoration of its Southgate Los Angeles plant for the assembly and finishing of Buick, Oldsmobile and Pontiac cars to be ready when the motor industry gets the signal to resume production. The Southgate plant was converted into a tank factory at the outset of the war and later assembled Douglas prefabrications. For a number of months it has stood idle. An estimated 4000 workers will man the reconverted plant.

* * *

Boeing's annual report for 1944 reveals gross sales of over $608,000,000, a 23.3 per cent increase over the previous year. Production showed an increase of 62.6 per cent in pounds of airplanes and spares delivered over 1943, with an increase of only 6.7 per cent in total number of employees. Net profits were $5,257,522, a 17.3 per cent increase over the previous year. Chairman C. L. Egtvedt reports that two new types of experimental planes were completed by Boeing during 1944. Information on one remains restricted and the other is the Boeing C-97 military transport, a 130,000-lb., double-deck ship which is the prototype of the Boeing postwar Stratocruiser.

* * *

Consolidated Vultee will move the last of its famed Liberator B-24's down the production line on May 25, and by that time will have delivered more than 7500 of these ships with the equivalent spares from the San Diego plant. Workers and facilities will thereafter devote their attention to the Dominator B-32 and RY-3 transport models.

Cited for Awards

• • • **The following companies have** received awards for outstanding war production:

Army-Navy "E"

Mesta Machine Co., Pittsburgh (fifth star)
Hamilton Foundry & Machine Co., Hamilton, Ohio (third star)
Glenn L. Martin Co., Baltimore.
Borg-Warner, Rockford, Ill. (third star)
Westinghouse Electric & Mfg. Co., Elevator Division, Jersey City, N. J. (fifth star)
Cooper-Bessemer Corp., Grove City, Pa. (second star)
Artcraft Metal Products Inc., Fall River, Mass.
Midwest Mfg. Co., Galesburg, Ill. (third star)
Steel Tank & Pipe Co. of California, Berkeley, Calif.
American Instrument Co., Silver Spring, Md.
Automatic Washer Co., Newton, Ia.
Batavia Metal Products, Inc., Batavia, Ill.
Bay City Shovels, Inc., Bay City, Mich.
Burgess Co., Inc., Cleveland.
Dickey Mfg. Co., Toledo.
Doehler-Jarvis Corp., W. B. Jarvis Division, Grand Rapids, Mich.
Dominion Electric & Mfg. Co., Mansfield, Ohio.
Grand Rapids Hardware Co., Grand Rapids, Mich.
International Detrola Corp., Detroit.
Keller Laboratories, Oneida, N. Y.
Machlett Laboratories, Power Tube Division, Norwalk, Conn.
Milprint, Inc., Plant No. 5, Milwaukee.
Pacific Rubber & Tire Mfg. Co., Oakland, Calif.
Silman Mfg. Corp., Arthurdale, W. Va.
Silverman Bros., Providence, R. I.
Tweedie Footwear Corp., Jefferson City, Mo.
Western Cartridge Co., U. S. Cartridge Co., St. Louis.
Zenith Optical, Division of Polan Industries, Huntington, W. Va. (fourth star)

Maritime "M"

Homestead Valve Mfg. Co., Corapolis, Pa. (fourth star)
Edwards & Co., Norwalk, Conn. (fourth star)
Edward Valve & Mfg. Co., Inc., E. Chicago (fifth star)
Cooper-Bessemer Corp., Grove City, Pa. (fifth star)

Issues New Rating For Distributors of Farm Machine Repair Parts

Washington

• • • **Distributors of farm** machinery repair parts hereafter will be entitled to AA-2 preference ratings for the purchase of repair parts for farm machinery and equipment, the WPB has announced. Previously, such items were obtained by distributors through ratings on Form WPB-547. The ratings granted, however, varied with the items, and the quantities obtainable were restricted.

Producers of farm machinery and equipment, WPB explained, already have been given priority assistance in obtaining repair parts either as production material for complete implements or for resale purposes. This new procedure gives similar assistance to distributors, who customarily buy repair parts from the same source as the machine manufacturers, but for resale only. The recent action serves to place the independent distributors on an equal footing with manufacturers.

The AA-2 rating will be granted only for items and components to be used and sold as repair parts for farm machinery and equipment and must be purchased from parts manufacturers. It does not include automotive replacement parts, nuts, bolts, screws, rivets and washers, nor does it include repair parts manufactured by producers of farm machinery and equipment under Order L-257. Such manufacturers, WPB explained, are required to sell the parts produced in their plants without ratings.

This happens to the best galvanized sheets...

Galvanized sheet steel is an excellent metal for many purposes, but there is one thing it won't do. It won't take and hold paint satisfactorily. The photo tells the story. The raw surface dried out the essential oils in the paint, caused it to become brittle. Result: early paint failure.

This happens even when the zinc surface is acid-etched. Etching has other disadvantages, too. Besides being troublesome and costly, it destroys part of the protective zinc coating.

Paint on regular galvanized steel *isn't* satisfactory . . .

But this bonds paint to zinc

ARMCO Galvanized PAINTGRIP sheets are the answer to this old problem. What's more, they give your products this *triple protection* . . .

1 The steel base has a *full-weight coating of zinc.*

2 The coating is given a special Bonderizing treatment at the Armco mills.

3 This "insulated" surface grips the paint finish in a lasting bond—prevents it from drying out quickly, retards peeling.

Whatever you make of galvanized steel that is to be given an *attractive and durable* paint or enamel finish, ARMCO Galvanized PAINTGRIP sheets are the logical choice. Write for the free PAINTGRIP booklet. It gives complete information. Just address The American Rolling Mill Company, 1431 Curtis Street, Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION

The "Scratch Test" shows how paint sticks to ARMCO Galvanized PAINTGRIP Steel. The top half of the sample is mill-Bonderized and when scratched with a pen knife only a slight mark can be seen. Paint on ordinary galvanized (bottom half) scrapes off readily.

The American Rolling Mill Company

SPECIAL PURPOSE SHEET STEELS

GALVANIZED PAINTGRIP ARMCO STEEL

PERSONALS

o o o

• **Thomas Robins, Jr.,** has been elected president of Robins Conveyors, Inc., Passaic, N. J., succeeding **Thomas Matchett,** who has retired from an active part in the management. Mr. Robins has been chairman of the executive committee for the past five years.

• **C. A. Campbell,** formerly district manager at Washington, D. C., has been appointed export sales manager of The Baldwin Locomotive Works, Eddystone, Pa., succeeding the late **Clyde G. Pinney. Milton W. Brooks** succeeds Mr. Campbell at Washington.

• **Comdr. John J. Bergen** has been elected chairman of the board of directors, Gar Wood Industries, Inc., Detroit. Commander Bergen has also been named chairman of St. Paul Hydraulic Hoist Co., a subsidiary.

• **O. S. Linderose,** former manager of Trio Tool Co., has been named manager of Rite-Way Tool & Mfg. Co., Detroit.

• **Robert E. Cramer** has been named chief engineer of the American Steel & Wire Co., Cleveland, succeeding **E. J. Reardon,** resigned.

• **Col. G. de Freest Larner** has been elected assistant to the president of H. K. Porter Co., Inc., Pittsburgh. Colonel Larner has recently returned to inactive status after more than three and one-half years of duty with the Army Air Forces both in England and the United States.

J. D. SULLIVAN, vice-president, The Colorado Fuel & Iron Corp.

• **J. D. Sullivan** has been elected vice-president of The Colorado Fuel & Iron Corp., Denver. Mr. Sullivan will continue in charge of commercial steel sales for the corporation.

• **Carl L. Hecker** has been named general works manager of the Philadelphia plant, ACF-Brill Motors Co., New York. From 1933 up to the present time, Mr. Hecker was plant superintendent for General Motors' Truck and Coach Division.

• **P. R. Mork** has been elected executive vice-president of Crane Co., Chicago. Mr. Mork, connected with the firm since 1901, was elected vice-president in charge of sales in 1934, and since 1941 has been a director of the company. **J. A. Dwyer,** formerly general manager of sales and branches, succeeds Mr. Mork as vice-president in charge of sales and branch houses.

• **Lud Emde,** affiliated with the Worthington Pump & Machinery Corp. for 15 years, has been elected vice-president, general manager and a director of Temprite Products Corp., Detroit, succeeding the late **John Wyllie, Jr. P. Fred Lesley** has become assistant general manager in charge of production, purchasing and finance.

• **Howard B. Cummings** has been appointed superintendent of the New Castle plant, United Engineering & Foundry Co., Pittsburgh, succeeding **Clark H. Johnson,** who has been transferred to a position on the city office staff.

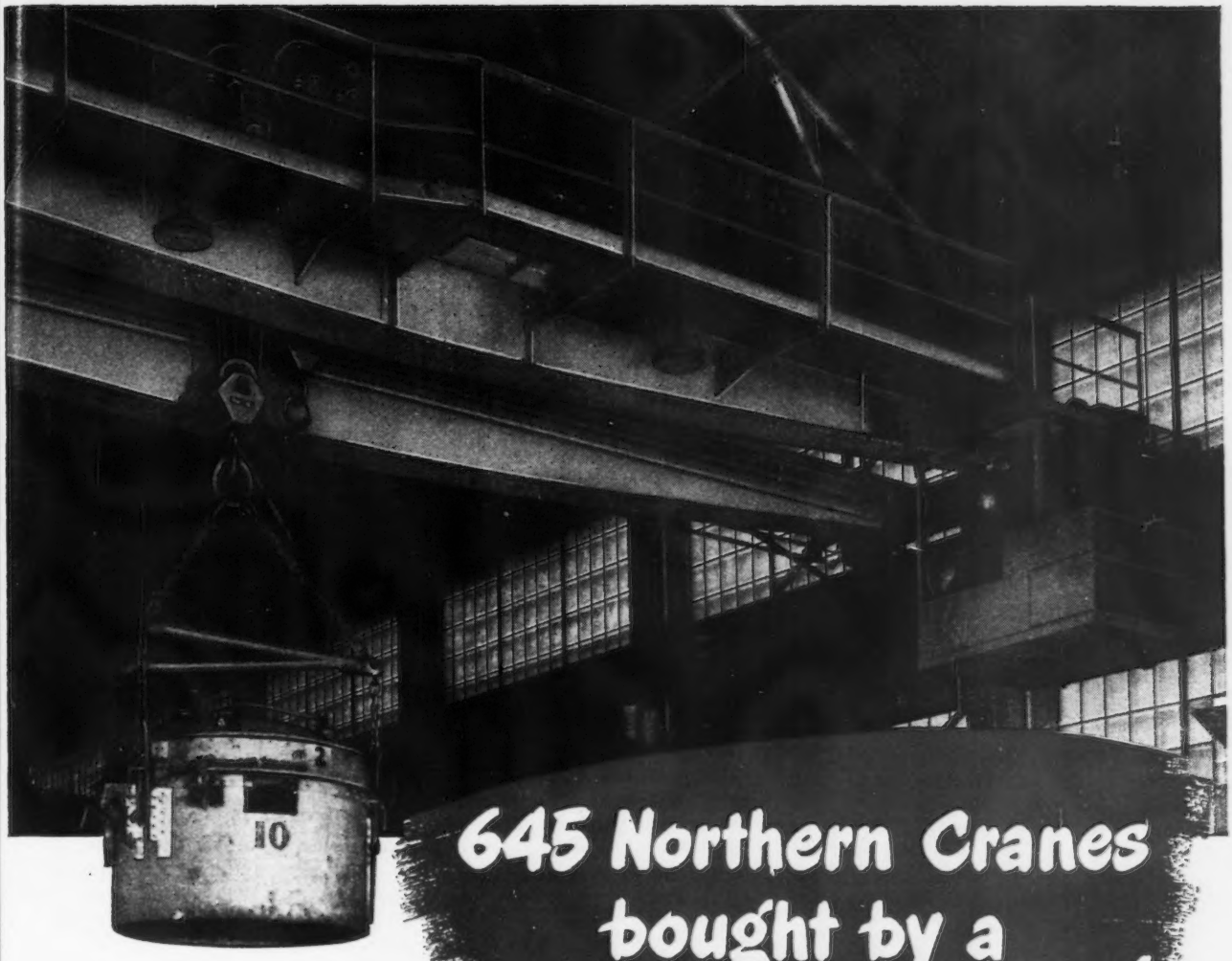
• **Leo A. Santry,** formerly eastern district manager for the Trailmobile Co., has been named product manager on B-K vacuum power brakes and Bendix brakes, Bendix Aviation Corp., South Bend, Ind.

• **Keen Johnson,** for the past year an assistant to the president of the Reynolds Metals Co., Richmond, Va., nas been made a vice-president. Mr. Johnson succeeds **W. G. Golden,** who has retired because of ill health.

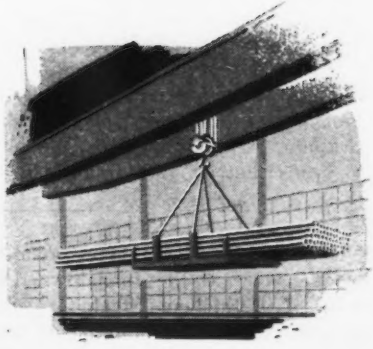
COL. G. de FREEST LARNER, assistant to president, H. K. Porter Co., Inc.

CARL L. HECKER, general works manager, Philadelphia plant, ACF-Brill Motors Co.

KEEN JOHNSON, vice-president, Reynolds Metals Co.



645 Northern Cranes bought by a SINGLE Customer!



Placing scores of repeat orders over a period of years, one large company has bought a total of 645 Northern Cranes.

Only one conclusion can be drawn from this continuous repeat business—Northern produces cranes which give lasting satisfaction.

These orders have included cranes of every type—capacities 5 to 75 tons—and for every sort of service from powerhouse cranes to heavy duty high speed mill cranes.

This is the largest number of cranes we have sold any one customer; but many companies regularly place repeat orders for Northern Cranes and have large numbers of them in operation.

There is a Northern Crane to meet your needs. Write for Bulletin I 712.

WRITE FOR BULLETIN

NORTHERN ENGINEERING WORKS

2615 ATWATER STREET, DETROIT 7, MICHIGAN

Offices in Principal Cities

W. E. REMMERS, vice-president, Electro Metallurgical Co.

• **W. E. Remmers** has been elected vice-president of the Electro Metallurgical Co., New York. Mr. Remmers previously was vice-president of the Electro Metallurgical Sales Corp.

• **Earl H. Fyler,** assistant superintendent of industrial relations at the Gary works, Carnegie-Illinois Steel Corp. since 1940, has been appointed assistant to the director of industrial relations, Chicago district. **Arthur H. Kofoed,** who has been with the organization since 1936, succeeds Mr. Fyler.

• **N. S. Peterson,** former vice-president of Steels, Inc., New York, has been appointed executive vice-president of the firm.

• **William D. Graham** has been appointed manager of the Greensboro, N. C., branch office of The Trane Co., La Crosse, Wis.

• **David H. Turner** has been appointed New York manager of the Cincinnati Electrical Tool Co., Cincinnati.

• **Charles H. Cox,** former general manager of the Enterprise Engine Co., San Francisco, has joined the Joshua Hendy Iron Works, Sunnyvale, Calif., as assistant to A. A. Browne, manager of engineering and sales.

• **Kenneth Ryder** has been appointed sales representative of the Corbin Screw Corp., New Britain, Conn., to cover the area embracing Maryland, Delaware, District of Columbia and parts of central Pennsylvania.

• **G. C. Reifel,** former general superintendent of manufacturing, car and marine division, Packard Motor Car Co., Detroit, has been appointed vice-president of manufacturing.

Frank J. Quigan has been elected chairman and treasurer of the Fedders Mfg. Co., Inc., Buffalo, N. Y. **Salvatore Giordano** has been elected president; **Edmund R. Walker,** vice-president and director and **Milton C. Weisman,** secretary and director.

• **Benjamin F. Courtright,** superintendent of metallurgical and inspection department of Wisconsin Steel Works for approximately 20 years, has been appointed sales manager of the steel division of the affiliated International Harvester Co., Chicago, succeeding **O. F. Seidenbecker,** resigned. **Russell H. Hart** has been appointed assistant sales manager of the division; **Frederick M. Washburn,** former assistant superintendent of the metallurgical and inspection department of Wisconsin Steel Works, has been appointed superintendent of that department, succeeding Mr. Courtright; **John R. Piggott** succeeds Mr. Washburn.

• **Tom M. Girdler** has resigned as chairman and director of the Consolidated Vultee Aircraft Corp., San Diego, Calif., after almost three and one-half years of service. Mr. Girdler will continue as chairman of the Republic Steel Corp.

• **Tracy V. Buckwalter,** who for the past 25 years has served as chief engineer and vice-president of The Timken Roller Bearing Co., Canton, Ohio, has retired, but will remain with the company in a consulting capacity.

ELLIS L. SPRAY, vice-president in charge of elevator and air conditioning activities, Westinghouse Electric & Mfg. Co.

• **Ellis L. Spray** has been elected a vice-president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in charge of elevator and air conditioning activities of the company at Jersey City, N. J. Prior to his recent election Mr. Spray had been vice-president and general manager of the Westinghouse Electric Elevator Co.

• **J. O. H. Anderson** and **H. B. Spackman** have been appointed assistant general managers of sales, Jones & Laughlin Steel Corp., Pittsburgh. **V. A. Jevon** has been named assistant general manager of sales to be in charge of Pittsburgh district sales office activities; **C. T. Hapgood,** manager of sales, tubular products; **E. W. Harwell,** Philadelphia district sales manager; **L. C. Berkey,** Chicago district sales manager and **C. C. Wehling,** St. Louis district sales manager.

OBITUARY...

• **August F. Lundquest,** who organized the Superior Tool & Mfg. Co., and later, with his brother, the Lundquest Tool & Mfg. Co., Worcester, Mass., died April 1.

• **Edson J. Noble,** chief engineer and secretary of the Horsburgh & Scott Co., Cleveland, died recently.

• **William J. Evans,** superintendent of the Rotary Electric Steel Co., Detroit, died recently.

• **Ralph A. Kent,** 59, superintendent of coke ovens at the Johnstown, Pa., plant of Bethlehem Steel Co., died suddenly April 16. Mr. Kent had been with Bethlehem and its predecessor, Cambria Steel Co., for 45 years.

• **John T. Stanier,** 80, who was a founder and served as vice-president and general manager of the West Penn Steel Co., Brackenridge, Pa., died April 11.

• **Anton F. Brotz,** 69, director of research for the Kohler Co., Kohler, Wis., died April 13.

FOLLANSBEE

CLAD METALS—VARIOUS COMBINATIONS

COLD ROLLED SHEETS & STRIP

POLISHED BLUE SHEETS & STRIP

ELECTRICAL SHEETS & STRIP

ALLOY BLOOMS, BILLETS, SHEETS, STRIP

SEAMLESS TERNE ROLL ROOFING

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K-1155

Dear Editor:

COLD TREATMENT

Sir:

We are very much interested in the article on "Cold Treatment in Gage Stabilization" by Charles T. Post in your March 15 issue. I wonder if we could obtain about six reprints as several members of our organization would like to keep it on file for ready reference.

W. E. BANCROFT,
Chief Metallurgist
Pratt & Whitney,
West Hartford 1, Conn.

● Tear sheets mailed.—Ed.

PERMANENT MOLD PRODUCER

Sir:

I read the article referring to the Reynolds Foundry at Springfield, Mass., which appeared in the issue of March 29, page 76. The permanent mold, said to be the largest ever produced, was completely machined in the shops of our company.

HENRY A. COLLIN,
Chief Engineer
Vermont Marble Co.,
Proctor, Vt.

TORQUE OF BOLTS

Sir:

The Chief Quartermaster at the Canal Zone desires to obtain your comments relative to the recommended torque for the average application of bolts and studs from ⅜ in. to 2½ in. dia.

B. F. BURDICK,
General Purchasing Officer
The Panama Canal,
Purchasing Department,
Washington, D. C.

● There is practically no printed information on this subject and most handbooks which list data on shearing and tensile strength of bolts give no information as to safe torques in tightening them. About a year ago John O. Almen of General Motors Research Laboratory presented a paper before the SAE entitled "How Tight Should a Bolt Be?" It is primarily concerned with fatigue resistance of bolt elements under various torque conditions. A copy can probably be obtained from the SAE, 29 W. 39th St., New York, or from the house organ "Fasteners," published by the American Institute of Bolt, Nut & Rivet Mfrs., Hanna Bldg., Cleveland. Some of the aircraft engine manufacturers have conducted research on this subject but so far as we know have not published any of their findings.—Ed.

IRON AGE INDEX

Sir:

Please furnish a copy of the 1944 index to THE IRON AGE.

F. L. ZIMMERMAN,
Technical Librarian
Western Electric Co.,
Chicago 23

● A copy is on the way.—Ed.

SHOT PEENING

Sir:

Please send us about 15 reprints of the article entitled "Mechanical & Metallurgical Advantage of Shot Peening," by O. J. Horger, in the April 5 and March 29 issues.

J. K. MARSHALL,
Plant Engineer
Standard Steel Spring Co., Gary, Ind.

. . . would like to have three copies . . .

C. W. HEPPENSTALL, JR.,
Vice-President in Charge of Operations
Heppenstall Co., Pittsburgh 1

. . . would like to secure four extra copies of this issue as soon as possible . . .

L. A. KRUGER,
Assistant Purchasing Agent
Eaton Mfg. Co.,
Spring Division,
Detroit 13

● Reprints will be mailed at 50c per copy.—Ed.

CUTLERY MANUFACTURE

Sir:

Is there any publication which treats of the manufacture of cutlery? Also, what types of machinery would be used in this particular industry?

ROBERT HENDRY
24 Stone St., New York 4

● We have been unable to find current published information on the manufacture of cutlery. This is an old established field of production and there is little new for discussion in the trade and technical press. A book in French—Manuel de Coutellerie by H. Cabanie—was published in Paris in 1932 by Bailliere. The following helpful magazine articles have been uncovered but, unfortunately, we cannot give their titles: Machinery—Aug. 1910, p. 1031-1032, and June 1911, p. 796; Abrasive Industry—July 1922, p. 213.—Ed.

PIG IRON PRODUCERS

Sir:

In going over THE IRON AGE we note on the Comparison of Price page you list No. 2 Valley Furnace. Will you please advise us where this particular pig iron is made and oblige?

W. WALTER WILLIAMS,
Purchasing Agent
Bond Foundry & Machine Co.,
Manheim, Lancaster Co., Pa.

● This is No. 2 foundry iron produced from Lake Superior ores in blast furnaces located in the Mahoning and Shenango Valleys in Ohio and Pennsylvania. A brief list of producers has been mailed. If seeking to purchase supplies of pig iron in the present tight market you might find it effective to contact a pig iron broker.—Ed.

LEAD ON PLASTIC

Sir:

In the article by Stanley Brams on plated plastics in the Feb. 1 issue there is a brief mention of lead plating on plastic, used for shielding radio equipment. We are endeavoring to keep ourselves posted on developments in lead plating and would like to follow this up. Can you tell us who is doing this work?

J. LeLAND BENSON
Lead Industries Assoc.,
420 Lexington Ave., New York 17

● The Monroe Auto Equipment Co., Monroe, Mich., has been plating battery cases with lead for shielding purposes, and I believe has used cadmium also.—Ed.

METAL POWDER PARTS

Sir:

In Dear Editor for April 19 in requesting powder metallurgical manufacturers, we find that you did not mention our name, although we are very active in the field of producing powder metal parts.

H. W. FISCHER
American Electro Metal Corp.,
320 Yonkers Ave., Yonkers 2, N. Y.

● Sorry for the omission.—Ed.

GAEDE ROTARY OIL PUMP

Sir:

We have been trying to accumulate all the data possible on vacuum pumps and have a pump catalog which refers to the production of a rotary oil pump in 1905 by Gaede as the basis for the mechanical oil pumps of today.

ARCHIE REID
William Reid Co.,
2271 Clybourn Ave., Chicago 14

● Perhaps readers may be able to offer suggestions.—Ed.

METAL CLEANING

Sir:

I would greatly appreciate your sending me a reprint of the article entitled "Chemistry of Surface Cleaning" by Ray Sanders, which appeared in the April 12 issue.

M. L. TINKER,
Chief Engineer
Shulton, Inc., Tool Division,
1500 Hudson St., Hoboken, N. J.

Sir:

Will you kindly furnish a reprint or tear sheets . . .

AL. WOODALL SMITH,
Chief Engineer
Rice & Adams Corp.,
Buffalo, N. Y.

Sir:

I would appreciate receiving a copy . . .

G. W. LaPIER,
Chief Metallurgical Control
Cleveland Graphite Bronze Co.,
Cleveland 10

● Tear sheets mailed.

SHAVED GEARS

Sir:

We would like to have two or three reprints or tear sheets of the article "Shaved Aircraft Engine Gears" by C. G. Pfeffer, in the April 12 issue.

J. R. STRONG,
Planning Department
Steel Products Engineering Co.,
Springfield, Ohio

● Tear sheets have been mailed.

PERFECT DUPLICATION

in one quick setup

...tomorrow or a year from tomorrow

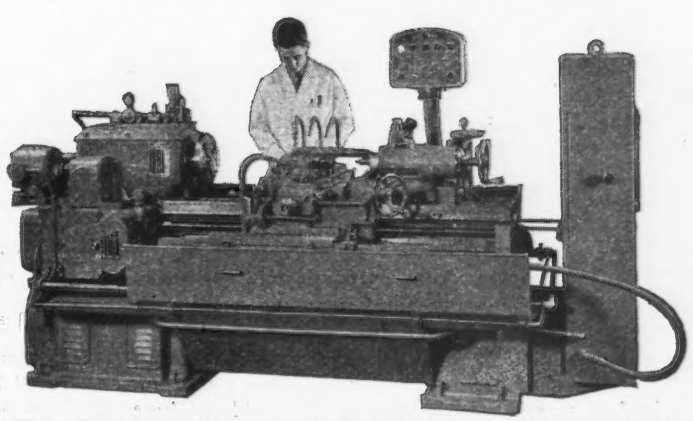
Setup to produce a job like this, involving straight, contour and taper turning, as well as facing and boring, can be made in a few minutes on a Monarch Magnamatic. Once set up, production is 100% automatic, permitting running of even small quantities economically, quickly and with precision.

The thin metal template which guides the tool can be stored in a small space, ready for perfect duplication of the work tomorrow or a year from now. Thus, short or long runs can be made at any time with the same precision and low cost as original runs.

The value of Monarch Magnamatics has been proved for a decade, in peacetime as well as wartime work. Since its introduction 10 years ago, we've made many improvements. Ask our representatives for details on how you can profitably use this fully automatic, all-electrically controlled machine for war production or for peacetime operation.

THE MONARCH MACHINE TOOL COMPANY • SIDNEY, OHIO

Monarch Saves Time



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Phone: Garfield 2590

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Maco Building
38 and College Avenue
Phone: Wabash 2650

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512 Empire Building
Liberty Ave. and Stanwix St.
Phone: Atlantic 6428

Representatives in Principal Cities

This Industrial Week . .

- ***Three-Month Steel Cutback to Be 2.8 Million Tons***
- ***Steel Price Increase Seen in About May 15***
- ***Raw Steel Output Gains One Point to 96%***

LAST minute developments in the steel picture early this week gave evidence that the characteristics of the heavy steel order volume for war materials would be changed substantially in the near future. The steel industry as a whole early this week had accepted VE-Day as a foregone conclusion.

While the drop in order volume is expected to be only temporary during the period in which cutbacks are implemented, the whole pattern of finished steel production and shipments will be somewhat different than it was when heavy war production predominated. Obviously, the first call on the nation's steel supplies will go to requirements needed to finish the Pacific war. It is in that segment of steel supplies over and above those needed for the Japanese war where the greatest change in production patterns will materialize.

Actual reconversion in steel mills presents no difficult problem. The major stumbling block, which will be temporary, centers on the unbalance of steel product schedules because of order suspensions and cancellations. The armed forces will move slowly at first in sharply reducing their needs, but within the next three months a secondary wave of military cutbacks is expected by many authoritative quarters.

At mid-week it appeared that military steel needs in the first three months after VE-Day would be slashed approximately 2,800,000 tons. With more than 2,300,000 tons involving carbon steel and the balance being alloy steel. This contemplated reduction is substantial since the military on a quarterly basis has recently been taking close to 8,000,000 tons of steel.

PROBABLY dashing cold water on any hopes for immediate large-scale production by manufacturers of ordinary civilian items made from steel is the near certainty that more than half of the steel to be released by military cutbacks will go to the railroads, farm implement industry and other essential civilian manufacturers. It is estimated that these consumers will be given about 1,500,000 tons of steel to be released during the three-months period after VE-Day. The balance amounting to more than 1,200,000 tons of steel may be available for other than essential needs, but this tonnage does not give rise to any hopes of large-scale civilian activity in the near future.

Probably signifying that cutbacks will be piecemeal is a meeting scheduled for Cincinnati within the next several days at which time Ordnance cutbacks will be discussed. Observers look for this meeting to result in a slashing of the heavy shell program. The only Army items which appear to be holding their own against all cutback proposals are big bombs and rockets. Programs for these products are still increasing.

The Wheeling Steel Corp. at Portsmouth, Ohio, is reported to have had its 100,000 500-lb. bomb contract doubled and Standard Steel Spring Co. has likewise had its bomb contract expanded.

Comparative slowness will characterize reconversion with a period of unavoidable confusion according to Washington reports. Some false starts and wrong turns are inescapable, WPB officials say. WPB expects soon to revoke 212 steel limitations order thus opening up permission for production of all types of consumer durable goods, the production of which has heretofore been prohibited.

WHILE the automobile industry is reported to have already placed orders on and if-as-and-when basis for approximately 300,000 tons of sheets, there is little indication in the trade as to how soon such tonnage can be produced. Sheet backlogs and current sheet demand for war purposes are so heavy as to pose a serious problem, if automobile sheets are to be produced in any quantity in the near future.

The steel price situation this week was slowly moving toward the point of actual announcement by OPA of permissible increases. OPA has approved a hike in many steel prices but its decision must be cleared with "higher ups" in the government. An announcement is expected by about May 15. Unless the signals are changed it appeared this week that moderate increases would soon be allowed the steel industry on hot rolled sheets, plates, wire rods, steel bars, nails, fencing and semi-finished steel. It seemed rather certain that no increase would be allowed on cold rolled sheets and strip, pipe and tinplate, and there was some question as to whether hot rolled strip and structural steel prices would be adjusted. Meanwhile the nonintgegrated steel group comprising 40 small steel companies continues this week to exert pressure on congressional members for the purpose of forcing OPA price action.

Electro-Motive Division of General Motors is understood to have booked six 5400 hp. diesel freight locomotives for 1946 delivery to Southern Railway, five 1000 hp. switchers for New York Central, six 600 hp. switchers for Long Island Railroad, and three 600 hp. switchers for Pennsylvania Railroad. National Railways of Mexico has ordered eight steam locomotives from American Locomotive Co., the same number from Baldwin Locomotive Works, and seven 2700 hp. road diesels from Electro-Motive. The Pennsylvania Railroad has ordered 10 new passenger cars from the Edward G. Budd Mfg. Co. Along with this order, Budd has also received orders for 30 more passenger cars for the Seaboard Air Line Railway and eight for Richmond, Fredericksburg & Potomac Railroad.

National steel ingot operations gained one point this week to 96 per cent of rated capacity.

• **PIG IRON TIGHT**—Because of low pig iron inventories both in producers' yards and in consumers' hands, WPB Steel Division officials had given consideration to the resumption of operations at several blast furnaces shutdown last fall when pig iron was in easier supply, but the plan has been held in abeyance until it becomes apparent that fuel and manpower will be available. The board reported that of a total of 214 available blast furnaces 207 were in blast at the beginning of April and seven were down for relining. Members of the Pig Iron Industry Advisory Committee were told that inventories in producers' yards were down to the lowest levels of the last 18 months and that consumers' inventories were also low as the result of small deliveries recently. Increased use of steelmaking iron was said to be one factor in the situation.

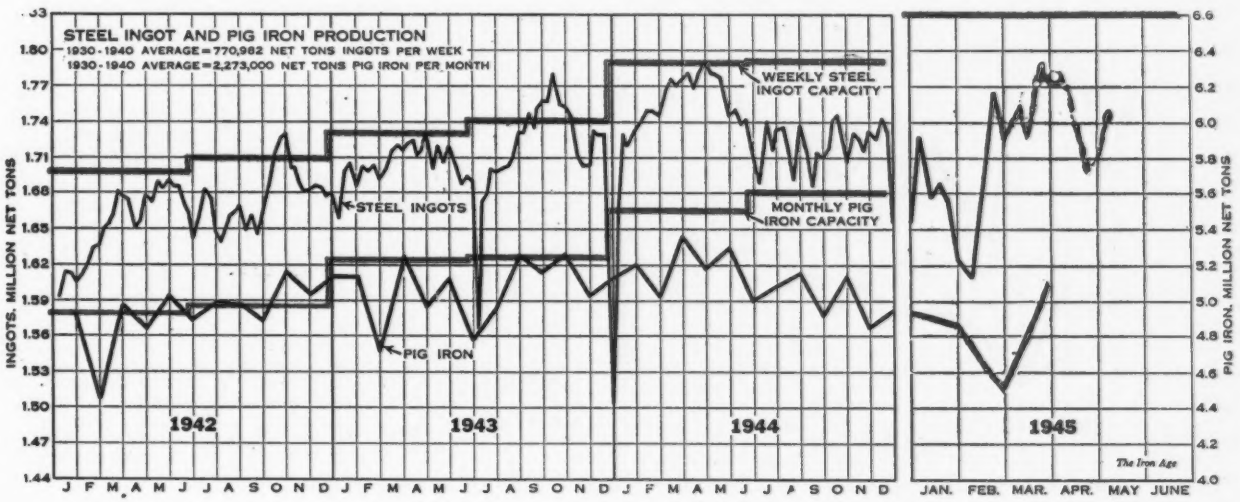
• **SCRAP SUPPLIES FURTHER REDUCED**—Stocks of iron and steel scrap at plants of consumers, suppliers, and producers continued to decline in February 1945, approximating 4,901,000 gross tons at the end of the month, representing a change of over two per cent from the 5,023,000 tons reported on Jan. 31, according to the Bureau of Mines. Consumers' stocks on Feb. 28 were 3,675,000 tons compared with 3,726,000 tons on Jan. 31, while combined stocks of suppliers and producers were 1,226,000 tons and 1,297,000 tons on the same dates. A decrease of 69,000 tons in stocks of purchased scrap held by consumers, and a decline of 71,000 tons in inventories held by suppliers and producers, were equally responsible for the loss in total supplies of scrap. The decline in stocks of purchased scrap held by consumers occurred despite a drop of 97,000 tons in the total use of this material in February from that reported in January. This indicated that shipments of scrap to consumers by suppliers and producers were still not large enough to support the high rate of consumption, much less increased inventories at the consuming mills.

• **STRUCTURAL BOOKINGS**—March bookings of fabricated structural steel for bridge and building construction were the largest since July 1944. Bookings for March as reported to the American Institute of Steel Construction, totaled 86,709 tons as compared with 59,825 tons reported for the preceding month and 27,836 tons reported for the corresponding month of last year. The reported shipments for bridge and building construction totaled 51,288 tons compared with 41,351 tons reported for the same month last year. The reported tonnage available for future fabrication on March 31 was 153,349 tons.

• **OPEN HEARTHS AND VE-DAY**—If a sharp decline, even though temporary, occurs in raw steel output after VE-Day, it is certain that this breathing spell will be utilized to rehabilitate and put in first-class shape those open hearth furnaces which during the war period have been pushed far beyond their original capacity. Although manpower shortages have held up or retarded many repairs and rehabilitations, even more important has been the absolute necessity for turning out as much steel as possible even to the extent of gambling on "break-throughs." One thing is now certain—capacity figures setup for specific furnaces or plants on a prewar basis are now and will continue to be substantially higher because necessity has shown what can be done in an emergency.

• **BASING POINT JITTERS** — The recent Supreme Court decision which held that single basing point pricing by the Corn Products Refining Co. and the Staley Mfg. Co. resulted in price discrimination has caused some speculation within inner steel circles as to the possible ultimate effects of these decisions on the multiple steel basing point system. Some steel men are of the opinion that there is little doubt that the Federal Trade Commission, flushed with success as a result of the recent Supreme Court decision will bend every effort to "go after" the multiple basing point system. The significance of the recent Supreme Court decision is discussed in this week's Washington column, p. 74.

• **B-24 CUTBACKS**—Reports growing out of the B-24 aircraft engine cutback that Buick had concluded negotiations with DPC for purchase of the Buick-operated Melrose Park, Chicago, engine plant have boiled down to the actual purchase by Buick of about $700,000 worth of DPC-owned machine tools. Layoffs at the plant were scheduled to number about 4000 May 1, the biggest single manpower cut to take place so far in the Chicago area. The plant is regarded as well suited to peacetime production, so the tool purchase could well prove to be a fertile acorn.


STEEL INGOT AND PIG IRON PRODUCTION
1930-1940 AVERAGE=770,982 NET TONS INGOTS PER WEEK
1930-1940 AVERAGE=2,273,000 NET TONS PIG IRON PER MONTH
WEEKLY STEEL INGOT CAPACITY
MONTHLY PIG IRON CAPACITY
STEEL INGOTS
PIG IRON
INGOTS. MILLION NET TONS
PIG IRON. MILLION NET TONS
1942
1943
1944
1945
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
JAN. FEB. MAR. APR. MAY JUNE
The Iron Age

Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
April 24.....	92.0	99.5	95.0	92.5*	101.0	106.5	89.0	62.0*	97.5	86.5	104.0	94.5	105.5	95.0
May 2.....	93.5	98.5	93.0	97.0	96.0	104.5	91.0	85.0	97.5	86.5	104.0	94.5	93.5	96.0

* Revised

IF YOUR BUSINESS IS MACHINING *STEEL*

THE EXPERIENCE OF AMERICA'S SHELL-MAKERS IS SIGNIFICANT

SHELL-MAKERS USING KENNAMETAL GET UP TO 6 TIMES THE OUTPUT PER UNIT OF CEMENTED CARBIDE CONSUMED

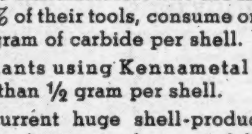
Recent official reports regarding the national consumption of cemented carbides on tools used for machining 105 mm shells disclose the following significant facts:

Where carbides other than Kennametal are used, the average consumption per shell produced has been about 3 calculated grams.

Four large manufacturers who use Kennametal for 50% to 100% of their tools, consume on the average, only ¾ of a gram of carbide per shell.

Three plants using Kennametal exclusively, average less than ½ gram per shell.

In the current huge shell-producing program Kennametal is being used successfully on all the large sizes for roughing, finishing, facing, cutting off, grooving, and chamfering, as well as for de-burring of band grooves with a distinctive lathe file.



The properties of Kennametal that produce such notable results for shell makers are equally valuable to any company in the business of machining steel. Even the toughest alloys, and those having a hardness up to 550 Brinell, can be readily machined at economy-promoting speeds, and with unusually long tool life.

The effective constituent of steel-cutting Kennametal is tungsten-titanium-carbide ($WTiC_2$), which distinguishes it from all other cemented carbides, and is a major reason for its outstanding success.

Kennametal field engineers are fully experienced in the application of cemented carbide tools. They will be glad to help you on any steel machining problem.

KENNAMETAL

SUPERIOR CEMENTED CARBIDES

KENNAMETAL Inc., LATROBE, PA.

Slow Reconversion to Follow VE-Day Cuts

Washington

By DONALD BROWNE

o o o

• • • Comparative slowness will characterize reconversion with a period of unavoidable confusion beginning immediately. Some false starts and wrong turns are bound to happen as war production is unwound. "It's inescapable," officials say. This situation is deviling all officials and businessmen who are trying to get the reconversion ball rolling. Not only original policies which are now announced may be subject to alteration due to war developments or changes in concept, but even statistics which are currently regarded as reliable may be wrong tomorrow.

There is a double-barreled desire to prevent unemployment which may be caused by a feeling that perhaps prices and wages will drop if businesses wait a little while before reconverting or starting new business and to prevent over enthusiasm in reconversion which might disrupt war production.

While the Office of War Mobilization and Reconversion has decided that cutbacks should be eased into areas to prevent panic and confusion, cutbacks now slated to start in May and continue at an accelerating pace will be severe enough to cause difficulty in shifting populations away from aircraft and shipbuilding centers to the forests and to textile mills.

WPB Chairman J. A. Krug, who announced the adjustment had started from requirements for a two-front to a one-front war before the Colmer (House) Postwar Committee on April 25, said that within three months the overall cutback of war expenditures might exceed the 12 to 13 per cent previously announced but added that the military is "Playing it safe."

He said, however, that the cutback percentage might reach 50 or 60 per cent within a year or 15 months.

Other high administration officials differing with Mr. Krug have said that by August 1, three months hence, the dollar value of actual contract cancellations will probably reach the 25 per cent rate. Mr. Krug, upon being asked by THE IRON AGE about this, said that he had not heard of the higher figure and declared that so far as he knew it had no background of fact.

Cuts are to be severest in Ordnance, Engineering and Signal Corps supplies. The War Department says that it is now just surveying cuts to be made in 2000 major procurement lines and that it will not know what is to be cut back until about May 10.

Consequently, the War Department says that it does not know what the size of the cut will be, the percentages of different programs affected, how individual plants or cities will fare and estimates of the number of men to become unemployed or laid-off.

Surveying the material situation for the Colmer Committee, Mr. Krug said that he expected that steel would be tight for months to come and that tin and lead might be short until V-J day. Copper and aluminum on the other hand, are expected to be in reasonably good supply for non-military production, he observed.

Newest estimates on the amount of steel to be made available by the cutbacks are that there may be somewhere between 3,500,000 and 5,000,000 tons released within the next three months. These estimates are upper limits of possible supply.

Mr. Krug said that chemicals, lumber and textiles would continue to be in short supply. He pointed out that before the construction industry can return to its peacetime employment of 2,000,000 men, the lumber industry must gain back the 125,000 men it has lost during the war to metal working industries.

With respect to the following problems, WPB's reconversion policies, as indicated by its top officials are:

Assistance for Small Concerns: Small concerns will either be given protective priorities, or individual assistance in getting materials.

Right now there is an order circulating in WPB designed to accomplish this purpose. Steel consumers who did less than $50,000 worth of business last quarter would be given an "S" symbol under the order to extend to their customers for the purchase of the metal. An AA-4 preference rating would be permitted to be extended to accompany the "S" allotments.

The spot authorization plan has been restored with permission to use idle and excess inventories of materials and may be instituted in "tight" labor areas.

Assistance in Securing Tight Components, Machinery and Materials: WPB is offering all possible assistance to industry generally and has embarked on a program of special as-

ALUMINUM HOUSE: *Having passed its technical tests and ready to go into production as soon as factory capacity can be allotted, an aluminum house, designed by the British Aircraft Industries Research Organization on Housing, is a one-story building made in four sections, each complete. Shown here is the kitchen and living room section being lifted off a trailer.*

sistance to more than 70 industries which anticipate some difficulty reconverting.

Two weeks ago, Office of Operations Executive Officer Wallace Skuce delegated to 200 men the responsibility of making a telephone survey of 72 industries. The survey was nationwide and information was requested of companies on their machine tools, capital equipment or minor new construction, manpower and material requirements to enable them to break even when their civilian production is again renewed.

Mr. Skuce discovered that the present going rate of the 72 industries is $3,000,000,000 and if completely turned loose on a peacetime basis could do $3,580,000,000 in a year. The break-even point for these industries would be about $1,200,000,000.

These industries will need to make the break-even point approximately $61,000,000 worth of new tools and $41,000,000 worth of new construction. When war business is gone, the entire need of these industries will be $231,000,000 in machine tools and approximately $183,000,000 in new construction.

On April 30, WPB announced that WPB field offices are now ready to assist persons who need bottleneck machine tools, capital equipment, or minor construction necessary to support a minimum practical production rate of needed civilian items. Direction 5 to order L-41 was issued which provides than an AA-3 preference rating will be provided for persons applying on form WPB-617 and marking them clearly "Reconversion Preparation."

Before WPB offices will approve, contractors must show: (1) It will not interfere with the war effort, (2) Construction is necessary before civilian production can be started and postponement would result in unduly delaying production when restrictions are removed, (3) The constructions and facilities are relatively a minor addition to or alteration of the applicant's plant, (4) The construction and facilities are no more than is needed for production at the minimum economic rate, (5) The construction and facilities are not for replacement or improvement of existing facilities, which though adequate are less efficient, (6) The production that will be manufactured must generally be one that is needed for the civilian economy.

Direction No. 2 to Priorities Regulation 24 just issued provides for the assignment of an AA-3 rating for the procurement of machine tools and other capital equipment, provided the application satisfies similar criteria to those for construction applications. WPB says that if capital equipment acquired under PR-24 can be installed under Direction 2 to L-41, no application under L-41 is required.

Because lumber is going to be short for packaging and the construction industries, WPB is putting on a drive for increased lumber output. The same is true for textiles needed by the automobile industry for upholstery.

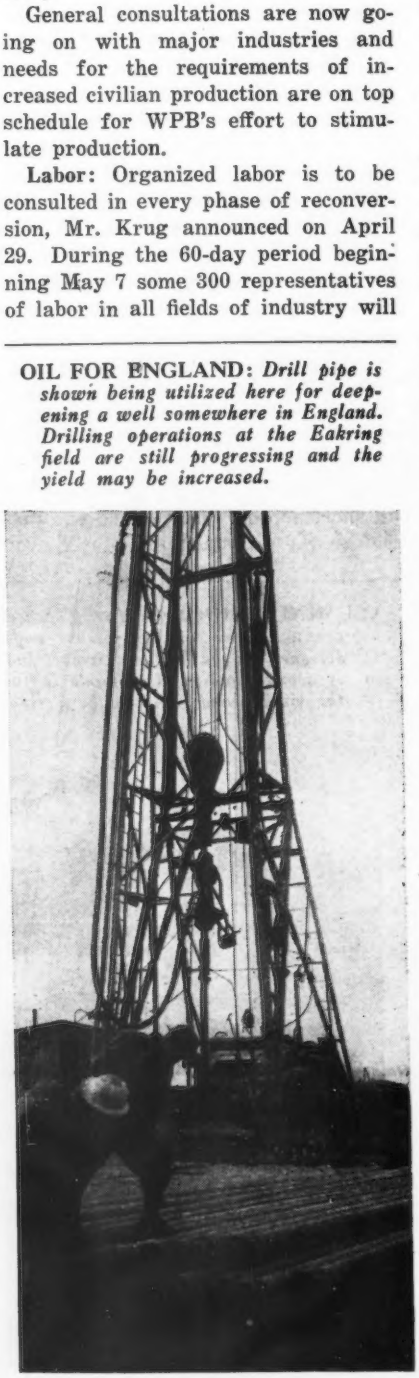
General consultations are now going on with major industries and needs for the requirements of increased civilian production are on top schedule for WPB's effort to stimulate production.

Labor: Organized labor is to be consulted in every phase of reconversion, Mr. Krug announced on April 29. During the 60-day period beginning May 7 some 300 representatives of labor in all fields of industry will be called to Washington for a series of meetings on reconversion problems.

These meetings are being called under the provisions of WPB Directive 40 issued March 5 which provides procedures for clearance and consultation on cutbacks. They are expected to develop recommendations for equitable distribution of the burden of cutbacks in the affected industries, WPB said.

Any proposals outside the jurisdiction of WPB will be referred to OWMR.

OIL FOR ENGLAND: *Drill pipe is shown being utilized here for deepening a well somewhere in England. Drilling operations at the Eakring field are still progressing and the yield may be increased.*



Questions Export Of Best U. S. Machinery

Chicago

• • • **Citing heavy lend-lease machinery exports,** R. C. Ingersoll, president, Ingersoll Steel & Disc Division of Borg-Warner, recently questioned the wisdom of equiping foreign countries better than American manufacturers.

"American industry will have to install the most modern, efficient, competitive machinery in order for us to get our share of world trade," he asserted in a recent speech, stating that priorities now hinder domestic manufacturers who wish to anticipate reconverson by retooling with up-to-date equipment.

He also stated that steel, machine tools and other basic industries should experience a brisk demand as manufacturers strive to take advantage of the latest and most productive equipment. Wartime technological advances will stimulate equipment purchases necessary to competitive efficiency as heavy goods industries adopt better methods and improve their products.

Small Advancement Announced by Krug

Washington

• • • **John D. Small,** executive officer of WPB, has been appointed chief of staff of the board of chairman by Chairman J. A. Krug. Both Mr. Small and Hiland G. Batcheller, chief of operations of WPB, will serve as deputies to the chairman.

At the same time Mr. Krug announced the resignation of Samuel W. Anderson, program vice-chairman and chairman of the requirements committee, and the appointment of Lincoln Gordon, deputy vice-chairman to succeed Mr. Anderson in both capacities.

Machine Tool Hearings Stress Need for Central Inventory Control

Washington

• • • Salient need for a central inventory of surplus machine tools was brought into sharp focus last week in Washington, when the problems of surplus machine tool disposal were given a public airing before the Surplus Property Subcommittee of the Senate Small Business Committee.

Throughout the melange of testimony presented during the three-day hearing by representatives of government, industry, and organized labor, the absolute necessity for such an inventory in the orderly and economically sound disposal of surplus machine tools was recognized as the key-note of the disposal problem.

Compilation of a central inventory has been urged by interested groups, for some time and it seems certain that as a result of this hearing, such an inventory will be made. Other important objectives including an amendment to the Surplus Property Law, await future developments, but some of industry's representatives went home feeling that some headway had been made at last.

Excerpts from the testimony given indicated generally that even less is known about the composition of the machine tool surplus than was previously thought, and that actually, there is little divergence of objectives. Also, there was little doubt as to the caliber of the staff which has been at work on this problem under Senator Stewart (D-Tenn.) and his associates.

Wendell Berge, Assistant Attorney General, was the first witness called. According to his testimony, in 1940 machine installations in plants in the U. S. numbered 827,000 units and by late 1944 the number of machine tools in this country was estimated to be 1,574,000.

"It appears," said Mr. Berge, "that about 38 per cent of the present supply of machine tools are 14 years old or older and an additional 14 per cent are between four and 14 years old. The more accurate and efficient tools constitute only about 48 per cent of the present installations and number approximately 747,000 . . . and do not appear to be an excess amount for our peacetime needs in an expanding economy."

Mr. Berge classed programs developed for the sale of tools to domestic trade schools and European industry following the last war as disappointing failures.

"As far as it can be determined," continued Mr. Berge, "the government now owns 75 per cent of the most efficient machine tools in the country. Four billion dollars' worth of tools have been built in this country since 1940, and of this amount 18 per cent has been shipped abroad. This leaves about 3.28 billions worth of machine tools produced since 1940 still in the U. S. If we estimate the original cost of a machine tool as about $4,400, this would mean that about 747,000 machine tools have been produced and kept in this country since 1940. Of this amount the DPC, the Army, the Navy and the Maritime Commission own approximately 555,000 units.

"In formulating a program for the disposal of surplus machine tools, government alone can provide full information . . . to make this information available is, of course, a task of major proportions."

In concluding his testimony, Mr. Berge mentioned the uncertainty as to the number and kinds of machine tools which may be retained by the armed forces as reserves for the future and never made available as surplus. Present estimates run from 15 to 20 per cent. "At the present time," said Mr. Berge, "there appears to be no over-all inventory of machine tools."

Colonel Edward H. Heller, of the Surplus Property Board, stated in his testimony that the Surplus Property Board does not believe that a machine tool glut will occur after the war. Nor did Colonel Heller subscribe to the view that we will have so many machine tools in surplus that the only sensible policy is to scrap three-quarters of them. "The only statistical knowledge we have," said Col. Heller, "on purchaser-demand for these government owned tools is from a survey issued December 15, 1944, by the war Department, Navy Department, and the DPC. This survey indicates that the War Department has $872,667,000, and the Navy has $477,457,000 in tools in private plants of war contractors.

"These contractors indicated in the survey a desire to purchase or lease for post-war use $124,546,000 of the War Department's tools or 14.3 per cent; and $164,833,000 of the Navy-owned tools, or 34.5 per cent of the total. Considering Army, Navy, and DPC tools together . . . contractors are interested in purchasing or leasing $550,000,000, or 25 per cent of the tools now in their possession."

Colonel Heller pointed out that the survey shows that plants having government owned production equipment up to $1,100,000 desire to purchase or lease, in the case of the Navy, about 50 per cent of the government owned tools in their possession, and in the case of the Army similar plants desire to purchase about 30 per cent in their possession. At the same time, the large plants having tools of $10,000,000 or more desire to purchase

EARTH MOVER: *Britain's answer to Adolph Hitler and his gang is shown as workmen swing the new British* 11*-ton bomb off the production line in a British factory. Note the size compared with the man in the foreground.*

less than 5 per cent of the Army or Navy-owned tools in their possession.

"It is estimated by the owning agencies," said Colonel Heller, "that together they have at present approximately 723,000 on hand; they are distributed as follows: DPC 285,000; Army 126,000; Navy, 254,000; Maritime Commission 22,000. The surplus after V-E Day will, it is estimated, be in the neighborhood of 441,000 machine tools. On the basis of a Army-Navy DPC survey of last year approximately 25 per cent of the total is desired by contractors in possession."

Colonel Heller later indicated doubt that tools now overseas would be returned.

As the hearings continued Brig. Gen. David N. Hauseman, Director of the Readjustment Division, Army Service Forces, appeared in behalf of the War Department.

According to General Hauseman, a survey of the machine tools located within the continental U. S. indicates that the War Department owns the following number of machine tools at the initial costs indicated:

	Number	Cost
In Industrial Facilities	145,902	$716,420,120
In Command Installations ...	16,677	32,913,110
Total	162,579	$749,333,230

The foregoing total includes all such tools except a small number engaged on scattered projects. It includes about 80 per cent standard general-purpose tools and about 20 per cent special-purpose machine tools.

General Hauseman stated that out of that 162,000 tools the average ages are as follows: over five years, 15,897; average three and a half years, 23,559; average three years, 120,079; average two years, 3044; total, 162,579.

Gen. Hauseman, continuing . . . "It must be appreciated that, at best, estimates on post war reserves would be very broad . . . uncertainties as to make it almost impossible for some agencies to furnish an intelligent estimate of their post war requirements."

The General continued that the best estimate that can be presently furnished regarding requirements for the post-war period (including war reserve and modernization of the permanent military establishment but excluding the Army Air Forces) is as follows:

Standard	
Number	Cost
34,425	$202,066,879
Special	
Number	Cost
4636	$28,591,752
Total	
Number	Cost
39,061	$230,653,631

He continued that "the War Department presently estimates that within 60 days after V-E Day, it can release 12,020 standard general purpose and 3000 special purpose machine tools, and that monthly thereafter for a period of four months, approximately 4400 standard general purpose and 600 special-purpose machine tools will be released . . . these figures cannot be projected with any scientific accuracy . . . six months after V-E Day it is estimated that 35,000 War Department tools will be declared surplus."

Within 60 days, General Hauseman estimated, we could have a central inventory of excess tools. (To this, Walter E. Joyce, Assistant Director, Surplus Property, nodded his head.)

Representing the Navy before Sen. Stewart's Subcommittee was Rear Admiral W. A. Buck, Assistant Chief of Procurement and Material for Property Disposition. According to Admiral Buck's statements three Navy bureaus control approximately 254,706 items of metal working machinery valued at $876,348,000, about 95 per cent of which is standard general purpose machinery.

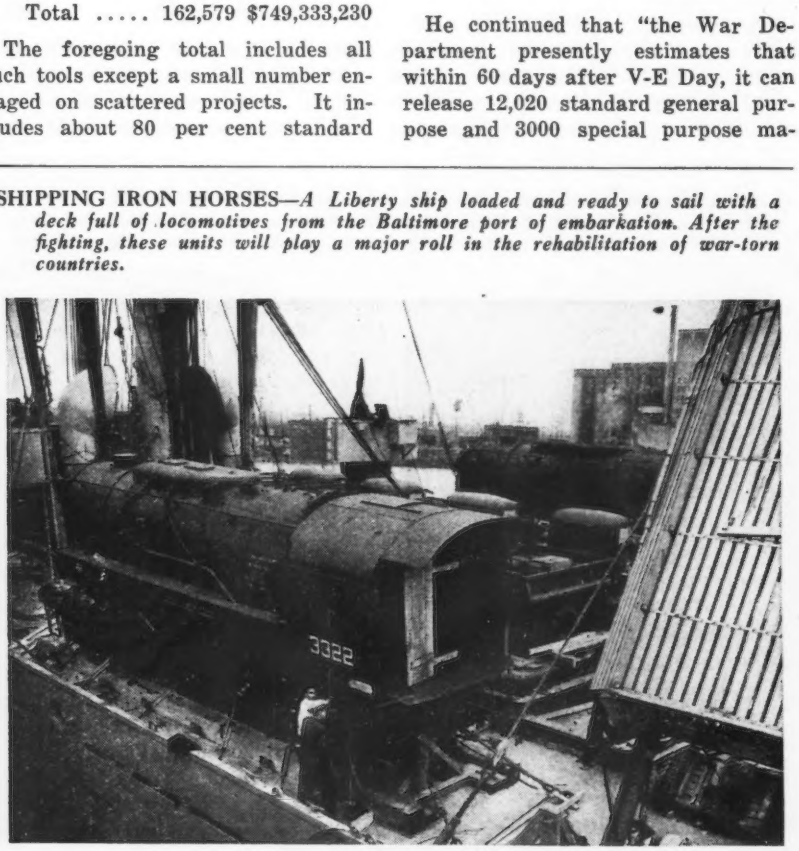
Some 155,350 of these items costing $535,575,000, or 61 per cent of the total are in use in government owned and privately owned plants wholly operated by war contractors; the balance are in use in Navy yards, ordnance plants, air stations, etc. Seventy-five per cent of Navy owned metal working machinery is estimated to be not more than five years old, and the average age of the items in this group is approximately two years.

Postwar retention plans of the Navy call for 99,356 items and 19,000 additional items will be taken over from contractors for postwar reserve; in addition, about 8000 items for modernization of Navy shore establishments will be taken over from contractors as the machinery becomes idle. It was noted that this will leave $440,000,000 worth of tools to be sold to industry.

Representing the National Machine Tool Builders Association Mr. Pease quoted association figures to the effect that the country produced from 1940 to 1944 inclusive an additional 984,000 tools of which approximately 197,600 were shipped abroad.

"That means," said Mr. Pease "that we have produced in these five years almost entirely for war uses 786,400 machine tools, thereby practically doubling the machine tools we have in the U. S. We know from painful experience that it takes about twice as many machine tools to win the war as it does to maintain prosperity in time of peace."

SHIPPING IRON HORSES—*A Liberty ship loaded and ready to sail with a deck full of locomotives from the Baltimore port of embarkation. After the fighting, these units will play a major roll in the rehabilitation of war-torn countries.*



Spot Authorization Plan Restored; Farm Machinery Steel Cuts Reinstated

Washington

• • • **WPB restored the spot authorization plan to full operation on April 27.**

Under the plan, manufacturers who have sufficient labor, manpower and materials to make an item whose production is now restricted, may upon qualification under the plan apply for permission to start this production.

When munitions requirements were suddenly boosted after the German push last December, the plan was suspended in 184 Group I and II labor areas, which included most of the country's industrial centers.

WPB Chairman J. A. Krug said that the program was restored as a part of the WPB's adjustment to reduced military demands, and that applications might be approved by Production Urgency Committees without the unanimous consent of all committee members.

Controlled materials, copper, steel and aluminum, will not be available in the immediate future, according to WPB officials for deferred allotments under the plan. Attention was called to the fact that idle and excess stocks may be used for non-military goods production.

At the same time, WPB announced the restoration to the farm machinery program of almost all of the tonnage slashed from second and third quarter steel allotments several weeks ago.

This move provides about 55,000 extra tons of steel for the current quarter, and 53,000 tons of steel for the third quarter, and enables farm machinery manufacturers to return to their first quarter output, in which 256,000 tons of steel was consumed.

The restored tonnage reflects recent munitions cutbacks, and was in response to an appeal by the War Food Administration. WFA said that maximum output of farm machinery is essential to continuously stepped up needs of farm products both on the war and home fronts.

Supreme Court Rule on Single Basing Point Causes OPA Price Study

Washington

• • • **Discussing the Supreme Court decisions of last week, which held that single basing point pricing by the Corn Products Refining Co. and the Staley Mfg. Co. resulted in price discrimination, OPA on April 27 said that they will bring a study of its price regulations to determine whether any changes will be required. The decisions, it was pointed out, will have no direct connection with price control.**

L. W. Moffett discusses significance of Supreme Court case on page 74.

Meanwhile, however, OPA said that a seller who has been found by the Federal Trade Commission or a court to be in violation of the Robinson-Patman Act and who would sustain substantial hardship if he eliminated price discrimination by lowering his higher prices to conform to that Act may apply under Supplementary Order No. 41, issued by OPA two years ago, for permission to increase his lower maximum prices to those purchasers in whose favor he has been found to have discriminated.

The price control agency said that in a number of industrial lines, the basing point method of pricing had long been in effect when OPA price regulations were drawn and consequently it was embodied in some regulations for those lines. The decisions, OPA said, have led to inquiries as to its plans with respect to certain of its maximum price regulations, which use the basing point system in establishing maximum prices.

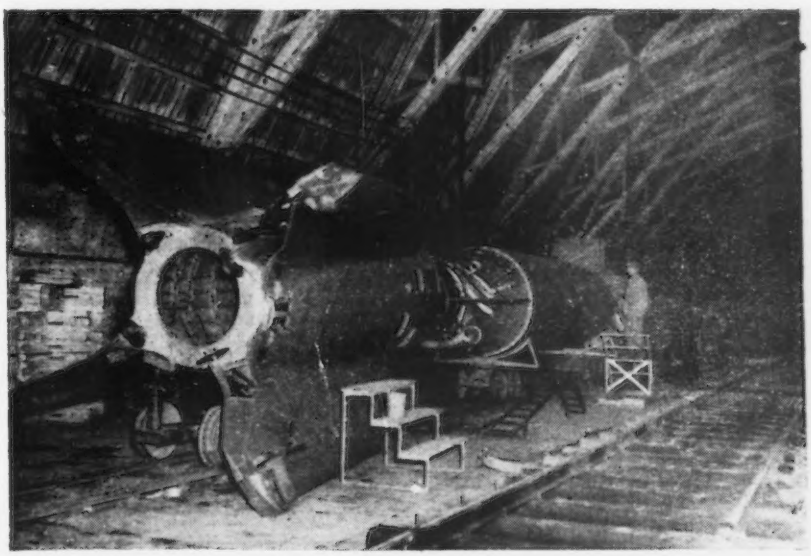
After pointing out that it seems clear from the decisions that basing point pricing is not violative of the law under all circumstances, OPA said:

"Whether, and to what extent, if any, it may be necessary for maximum price regulations to be amended in view of the Corn Products and Staley cases can be determined only after careful study of the two Supreme Court opinions of April 27.

"While this study is being completed, compliance with the regulations will not compel any seller to violate the Robinson-Patman Act. The price discrimination that might under some circumstances flow from charging the full maximum price permitted by a regulation can always be avoided by charging a lower price that will not cause discrimination in favor of the seller's other customers."

OPA then explained how the price discrimination may be avoided by applying under Supplementary Order No. 41 to increase lower maximum prices to buyers in whose favor there was discrimination.

V-2 ASSEMBLY LINE: *U. S. First Army soldiers view one of the V-2 rocket bomb assembly lines, with unattached parts on rails, at an underground factory at Klein Bodungen, 62 miles west of Halle, Germany.*



Steel Orders for Second Quarter Reinstated by Railroad Carbuilders

Chicago

• • • **Railroad carbuilders** have reinstated a substantial proportion of the steel orders which they were forced to cancel last month following a sharp slash by WPB in second quarter Office of Defense Transportation steel allotments. Moreover, the orders go back on the books tabbed for second quarter delivery.

Delivery of this material will place the builders in a position to fill commitments which were scheduled prior to the beginning of the quarter, but will not enable them to take on any new business. ODT's original request to WPB was for 250,000 tons of carbon steel to build 13,500 cars but WPB granted only 135,000 tons for about 7500 cars. Most of these are to be box cars. It is understood that if material conditions relax sufficiently, ODT would like to get material for 35,000 cars for the year and will work toward this or a higher goal. Approval by WPB of such a program probably would be contingent upon the extent of VE-Day ammunition cutbacks.

Even though the flat rolled and structural delivery picture brightens as a result of reduced Maritime Commission requirements, increased railroad car construction is contingent upon ability to secure axles and wheels. Deliveries on these items currently are being quoted into the first quarter of 1946. Railroads now are anticipating their first quarter 1946 maintenance and repair wheel requirements. Completion of repairs at the Gary mills of Carnegie-Illinois will enable a very slight additional production of rolled steel wheels there commencing in September.

The reinstatements are believed to have no connection with recent reports that drawings are being prepared for 26,750 20-ton box cars and 11,500 20-ton gondolas to be purchased by the army for France. Inquiries are expected for these cars sometime this month—May. Steel requirements for these cars are expected to be comparatively light because of their small size.

There are indications that the 417,000 tons of replacement rails allotted domestic railroads for the second quarter may be increased by slightly less than 20,000 tons. The ODT originally had requested 600,000 tons of replacement rails for the quarter, representing the steel industry's entire controlled cooling capacity. Foreign demand originally calculated to be large, now is placed at something less than 100,000 tons for the entire year, it is understood. The balance of the rail cut was due to conflict with heavy shell steel requirements. If artillery shell production is cut within the next 30 or 60 days, as indicated April 25 by Robert P. Patterson, Under secretary of War, rail tonnage should be in a preferred position for reinstatement. Mill deliveries on rails are reported close to schedule.

OPA Approves Price Increases On List of Carbon Steel Products

Washington

• • • **OPA has approved** steel price increases totaling $60,000,000 and these increases were sent to Economic Stabilizer William H. Davis for his approval on May 2. Together with product increases covered by the interim order last January, total increases if approved will amount to $100,000,000.

The steel industry had indicated a need for increases totaling more than $150,000,000 a year. Small companies presidents have given various members of Congress in the last two weeks the story of how OPA's delaying policies are driving them into the red.

On the same day steel prices went from OPA, representatives of 40 small companies headed by Robert Wolcott, president of the Lukens Steel Co., and Senators and Representatives from steel producing states met with Mr. Davis to discuss the proposed price increases.

The increases are understood to cover a wide general list of carbon steel products. Cold rolled strip and sheets, structurals, pipe and tin-plate are not slated for price increases.

Senator Homer E. Capehart, Republican of Indiana, said that OPA policies had hurt the six small companies in his state and badly. Mr. Capehart has also talked with industry officials.

He declared that he had talked with Economic Stabilizer Davis. Mr. Davis' position was that inasmuch as big steel companies were making money on shipyards and subsidiary lines that to grant a price increase to the "little fellows" would necessitate giving it to the big ones.

"They are very much confused," Senator Capehart said, "and they feel so long as the steel industry as a whole is making a profit, the Administration is protected in its stand against price increases with labor and with the public."

Surplus Property Disposal

Washington

• • • Surplus property disposals moved ahead again in March to a new high totaling $39,861,000 against $35,452,000 in February, the Surplus Property Board reported recently. During that period, the property turned over by the owning agencies for disposal dropped to $123,695,000 from $135,005,000 in February. Inventories in the hands of disposal agencies stood at $1,399,283,000 on March 31, as compared with $1,315,449,000 a month earlier.

Following is a summary of the activities of the disposal agencies in March:

	Cost of Property	Price Received	March 31 Inventories
Treasury Department	$16,550,000	$6,024,000	$106,793,000
Reconstruction Finance Corp.	19,579,000	9,808,000	1,255,864,000
Maritime Commission	1,006,000	844,000	9,650,000
War Shipping Administration	2,663,000	1,139,000	9,810,000
Foreign Economic Administration	63,000	61,000	1,175,000
War Food Administration*	.....	.....	83,000
National Housing Agency	.....	.....	166,000
Federal Works Agency	.....	.....	15,742,000
Totals	$39,861,000	$17,876,000	$1,399,283,000

*WFA owned stocks not included.

Bethlehem Output Hits 104% Using Coal and Scrap Reserve Stocks

New York

• • • **Current steel production** of the Bethlehem Steel Corp. approximates 104 per cent of capacity, including ingots and castings, it was revealed by President Eugene G. Grace in reporting income for the first quarter of 1945. However, production during the quarter averaged 98.3 per cent, compared with 103.5 per cent during the corresponding quarter of 1944.

This relatively high rate of production during the quarter was attributed by Mr. Grace to available reserves of coal and scrap which could be drawn on during the period of coal stoppages and winter transportation difficulties, and to failure of Bethlehem to suffer as greatly from manpower shortage as some other steel producers. The latter factor is shown by the following average employment figures: first quarter, 1945—237,370; fourth quarter, 1944—239,765; first quarter, 1944—282,969.

The Bethlehem shipbuilding program was reported to continue at peak capacity, with no significant cutbacks to date. Unfilled orders at the end of the quarter totaled $1,194 million, compared with $1,240 million at the end of the year.

Incompleted construction projects amounted to $75 million at the end of the quarter, compared with $58 million at the end of the year. Much of this increase is represented by the contemplated revamping of bar finishing capacity at the Lackawanna plant, which is estimated to cost $15 to $20 million. The objective in the construction program is an expenditure of about $5 million this year, assuming government approval can be obtained. More than a million was spent on construction projects during the first quarter.

Mr. Grace said that foreign expansion plans of Bethlehem, reported months ago, had not reached the stage for discussion. However, he indicated that consideration was being given to South America where the climate was favorable to year-round activities. Bethlehem was said to be not interested in the recent Labrador iron ore development.

Asked about the prospects for full utilization of alloy scrap, Mr. Grace replied that Bethlehem was buying alloy scrap at a premium price, was segregating it and using it for the production of alloy steels on a large scale. He excluded turnings, however, and recommended that this material be remelted in the blast furnace.

Net income for the quarter, after deducting for estimated income taxes, was $7,695,909, compared with $16,379,398 last quarter and $6,432,538 for the first quarter of 1944. Net income after deducting dividends for preferred stock was $2.03 per common share during the quarter, compared with $4.94 per share during the fourth quarter of 1944, and $1.61 for the first quarter of 1944. Dividends for the quarter were $1.50 on the common and $1.75 on preferred shares.

The payroll was $199,779,960 during the quarter, compared with $225,475,365 a year ago. The average hourly pay was $1.396 during the quarter. Average weekly earnings was $65.44, as compared with $61.29 a year ago. Average hours of work per week rose to 46.9 from 45.2 a year ago.

Mr. Grace strongly advocated the scrapping of all equipment of war, beyond what is required for preparedness, after the cessation of hostilities. He specifically excluded producing plant from this recommendation.

Charcoal Iron Price Advanced

Washington

• • • **OPA has granted** the Newberry Lumber & Chemical Co., Newberry, Mich., an adjustable interim price increase of $5 a ton on charcoal pig iron, raising the level to $39 furnace, from $34. Under the order the price increase can be adjusted on contracts back to Feb. 13. The order will expire on July 31, unless extended. The increase was given, OPA said, because of the inability of the company to get manpower to cut lumber and a consequent rise in costs of production. Pending the expiration date of the order OPA will get cost data from the company.

PIG IRON OUTPUT: *Necessity for repairs again reduced pig iron output in March. Furnaces in the aggregate in the country operated at 88.4 per cent of capacity in March, compared with 91.4 per cent in February. In some sections of the nation pig iron supplies are quite tight, especially in the East.*

Blast Furnace Capacity and Production—Net Tons

Source: American Iron & Steel Institute

	Number of Companies	Annual Blast Furnace Capacity	PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL			
									Per Cent of Capcaity	
			March	Year to Date	March	Year to Date	March	Year to Date	March	Year to Date
DISTRIBUTION BY DISTRICTS:										
Eastern	12	12,988,970	909,339	2,518,834	31,009	81,953	940,348	2,600,787	85.2	81.2
Pittsburgh-Youngstown	15	25,901,240	2,057,602	5,867,618	20,620	57,090	2,078,222	5,924,708	94.4	92.7
Cleveland-Detroit	7	6,589,500	556,522	1,487,146			556,522	1,487,146	99.4	91.5
Chicago	7	14,070,510	1,108,841	3,169,379			1,108,841	3,169,379	92.8	91.3
Southern	8	4,924,670	358,441	1,018,630	14,265	40,119	372,706	1,058,749	89.1	87.2
Western	4	2,836,000	171,151	494,783			171,151	494,783	71.0	70.7
TOTAL	37	67,313,890	5,161,896	14,556,390	65,894	179,162	5,227,790	14,735,552	91.4	88.8

VE-Day to Find WPB Revoking Orders to Open Up Consumer Output

Washington

• • • **WPB expects to revoke 212 orders on VE-Day, opening up permission for production of all types of consumer durable goods the production of which has heretofore been prohibited.**

All steel restrictions will be lifted except the basic order, M-21, and controls over certain of the ferro-alloys such as nickel. Aluminum will be freed immediately, as will copper.

WPB spokesmen say that CMP will be open-ended for aluminum within two or three days and for copper within two or three weeks. Steel will be under allocation with two new allotment symbols to be adopted in the reconversion periods—"MM" for military and "CC" for civilian. When steel controlled by CMP will be open-ended, is conjectural.

Most revocations which have taken place to date have been of orders which called for simplification and standardization. A limited number, however, prohibited production and delivery to non-essential users and others forbade the use of iron and steel in their manufacture.

WPB revoked the following orders on April 28:

ORDER NO.	TITLE	ABSTRACT OF PRIORITIES ACTION
L-29	Metal Signs	Restricts use of iron and steel in production and installation of signs or accessories.
L-39	Fire, Protective Signal and Alarm Equipment	Restricts use of scarce material, transfer of specified equipment, manufacture.
L-43	Motorized Fire Apparatus	Restricts manufacture, use of materials on Appendix A and sale and delivery, schedules production and delivery.
L-108	Finishes on Metal Working Equipment	Restricts painting of equipment, parts or assemblies, except by ultimate purchasers.
L-154 Sch. 1	Power, Steam and Water Auxiliary Equipment Water Meters	Prohibits production of water meters containing copper or copper base alloys, stainless steel or nickel alloys, or tin in coatings.
L-154 Sch. 2	Steam Surface Condensers	Restricts use of materials in steam surface condensers.
L-154 Sch. 5	High Voltage Insulators	Restricts materials and specifications in manufacture, limits cape and tin type suspension insulators, switch and bus insulator, establishes restrictions on testing, production, deliveries and acceptance.
L-188	Loose-Leaf metal Parts and Units	Standardizes loose-leaf metal parts and limits amount of iron and steel which may be used.
L-206	X-Ray Equipment	Restricts shipments of medical X-Ray equipment to civilians, by dollar value to 75 per cent of base period.
L-211 Sch. 1	Concrete Reinforcement Steel	Establishes specifications and restricts size and shape.
Sch. 2	Steel Wheels and Tires	Establishes specifications and restricts size and shape.
Sch. 3	Barbed Wire, Wire Fence, Poultry Netting and Flooring.	Establishes specifications and restricts size and shape.
Sch. 4	Structural steel Shapes	Establishes specifications and restricts size and shape.
Sch. 5	Steel Axles and Forgings	Establishes specifications and restricts size and shape.
Sch. 6	Mechanical Steel Tubing	Restricts production by quantity, sizes and specifications.
Sch. 7	Rails and Track Accessories	Restricts production, fabrication, delivery and acceptance to specifications in List 1.
Sch. 8	Carbon Steel Plates	Limits production, delivery and acceptance of delivery to List 1 or 2 specifications.
Sch. 10	Water-Well Tubular Products	Restricts, production, fabrication and delivery to specified sizes, specifications and weights.
Sch. 11	Steel Pressure Pipe	Restricts, production, fabrication and delivery to specified sizes, specifications and weights.
Sch. 12	Steel Pressure Tubes	Restricts production, fabrication and delivery to specified sizes, specifications and weights.
Sch. 13	Steel Pipe	Restricts production, fabrication and delivery to specified sizes, specifications and weights.
Sch. 14	Steel Fence Posts	Restricts production to conform to specifications.
Sch. 15	Hot-Rolled Carbon Bars	Restricts production and delivery to designated sizes, restricts acceptance of delivery.
L-214 Sch. 2	Corrective Spectacles	Restricts use of optical metal in manufacture.
Sch. 3	Medical and Surgical Furniture and Related Equipment	Establishes standards and specifications for specified items, limits metal use.
L-235	Airport Lighting Equipment	Prohibits manufacture of other than "approved" equipment except for experimentation.
L-236	Marine Joiner Hardware	Restricts manufacture, fabrication or assembly to specified sizes, styles, number and grades.
Sch. 2	Marine Fittings Hardware	Restricts manufacture, fabrication or assembly to specified sizes, styles, number and grades.
L-238	Sun Glasses	Prohibits use of metal and restricts use of thermoplastics.
L-252	Valve and Valve Parts	Establishes specifications of size and materials for production.
L-259	Physical Therapy Equipment	Prohibits manufacture, delivery, sale or acceptance except to government departments, establishes production and delivery schedules.
L-266	Steel Pipe Fittings	Limits manufacture to specified types, sizes and specifications.
L-288	Grey Iron, Malleable Iron and Brass and and Bronze Pipe Fittings	Limits manufacture to specified types, sizes and specifications.
L-299	Power Boilers	Limits manufacture to specified types, sizes and specifications.
L-327	Aircraft Lighting Equipment	Restricts manufacture, sale, delivery and installation.
U-5	Communications Wire and Equipment	Restricts sale, purchase, rental or other commitment to orders rated AA-5 or higher.
U-6	Wire and Cable Telegraph Industry	Establishes standards for conserving scarce materials, limits additions and installations, restricts replacements, tie-lines, service, teletypewriter exchange service, private line service.
U-8	Telephone Instrument	Set up priorities for installation of new instruments, length of service lines, prohibits new installations for civilian uses.

Other orders scheduled for early revocation were:

ORDER NO.	TITLE	ABSTRACT OF PRIORITIES ACTION
L-42	Plumbing and Heating Simplification	Prohibits manufactures except according to specification.
L-126	Industrial and Commercial Refrigeration and Air-Conditioning Machinery and Equipment	Prohibits related machinery from production except as authorized to required specifications.
L-145	Aircraft Control and Pulley Bearings	Prohibits manufacture of specified sizes except by authorized producers, requires manufacturers to retain tools and equipment.
M-28	Dichloro-Difluoro-Methans	Prohibits deliveries for certain uses, restricts deliveries by suppliers and producers.
M-53	Printing Ink	Restricts use of materials in manufacture.
M-110	Molybdenum	Requires report if more than 2000 lb. is sold in one month.
M-154	Nitro-Cellulose	Restricts use in manufacture of specified articles.
M-303	Calcium Metal	Establishes allocation control.
P-116	Osnaburgs	Assigns preference rating to defense supplies corp.

Pittsburgh Steel Foundry Buys Stock of Spring & Steel

Pittsburgh

• • • **With the acquisition of the stock of the Pittsburgh Spring & Steel Co. completed, the Pittsburgh Steel Foundry Corp. on May 2 took over the active management of the former company, which will be operated as a division of Pittsburgh Steel Foundry Corp. G. D. Thompson, chairman and president of Pittsburgh Steel Foundry Co., announced the new officers of the new division of the company. They are: G. D. Thompson, president; E. S. Weidle, vice-president; W. C. Brown, secretary; and M. A. Colwill, treasurer. The board of directors has not yet been elected. It is anticipated that the business of the spring division will be carried on in the same manner as before the acquisition, but the sales efforts of the two companies will be coordinated. The railroads form the biggest outlets for the products of both companies, thus making the coordination of such sales efforts easy.**

Pittsburgh Spring & Steel Co. was incorporated in 1902, and was headed by J. A. Noble, president, and S. F. Krauth, vice-president, who were the majority stockholders in the company. The acquisition, which required the purchase of some 5000 shares of $100 par value stock, was a cash deal.

National Steel Net Boosted

Pittsburgh

• • • **National Steel Corp.** reports net earnings after all charges, including provision for depreciation and depletion, interest charges and Federal taxes, for the quarter ending March 31, 1945, of $3,429,888, equal to $1.55 per share on 2,206,392 shares. This compares with net earnings of $2,550,143, equal to $1.15 per share on 2,206,267 shares, reported in the first quarter of 1944.

Steel Industry Sees Temporary Period of Confusion Following VE-Day

New York

• • • **The period of reconversion following VE-Day will probably bring almost as many production and distribution headaches as occurred in the early days of conversion to war activity, according to some steel observers. There seems little ground for believing that steel customers aiming to produce ordinary or normal products will find anywhere near the amount of supplies needed for some time to come, it is believed.**

Actual reconversion in the steel mills themselves presents no difficult problem. Major stumbling block, which will be temporary, centers on the unbalance of steel product schedules. While it may take some time for the full effect of cutbacks to be translated into substantial tonnage cutbacks, a greatly expanded wave of order suspensions is expected.

Early this week many steel consumers with orders already on steel mill books were becoming apprehensive over the possibility that VE-Day would find large tonnages of steel on its way, even though later cutbacks would eliminate the need for this material. Such consumers were faced with one of two decisions: Either they must let the material continue to flow to them; or they could put in a suspension order. In the latter case, delivery promises would become void as steel mills would be forced to supplant such orders with other business on the steel mills schedules.

Steel leaders at mid-week expected a "relative" chaotic condition for a short time at least, especially with respect to an economical utilization of steel ingots and rolling mill capacity. The increase in the number of suspension orders presents a problem of product-mix. The period between VE-Day and clear-cut steel cancellations, as a result of military cutbacks, will be one to tax the ingenuity of steel order and scheduling officials.

With a large segment of the steel industry's output definitely earmarked for the production of steel to be used in the Pacific theaters, the amount of steel available for civilian use is not expected to be as great as now generally supposed. First call on such civilian steel will go to essential civilian industries, such as railroads, public utilities the oil industry, hospitals and those fields making household appliances in the "essential" category.

According to steel circles there lurks in the reconversion picture the same old danger to distribution which occurred during the conversion days—too many blank checks in the form of priorities on a limited bank balance of available material. According to authoritative opinion military needs for the Japanese war must and will come first regardless of what changes must be made in the most carefully thought-out civilian production plans.

Steel leaders are not kidding themselves by thinking that the next few months will be free from sharp fluctuations in the steel ingot rate. Necessary adjustments resulting from cutbacks almost assure a temporary irregular production pattern. The mere fact that raw steel is available does not mean that all finished steel products will be plentiful. The availability of finished steel products will depend entirely on a combination of product-mix for war and essential civilian items as well as the easy or tough operation of a new or revised priority system. There will be a terrific pressure from steel company customers to obtain part of the available steel tonnage slated for civilian manufacture. Because of its importance in the past as a large consumer, the automobile industry will be well up front.

Blaw-Knox Announces Purchase of Buffalo Concern

Pittsburgh

• • • **Blaw-Knox this week announced that it had purchased the plant, inventory and uncompleted contracts of the Buffalo Foundry & Machine Co., Buffalo. The property includes an 18-acre site on which are located a foundry, pattern shop, plate fabricating shop and a research laboratory.**

The new addition will be known as Buflovac Equipment Division of Blaw-Knox Co.

William P. Witherow, president of Blaw-Knox, said that "The acquisition of this property is a further effort to strengthen our company's postwar position in the equipment industry."

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LABRADOR ORE DEPOSITS: ***Under exploratory development for several years, large ore deposits have now been proven in Labrador. The M. A. Hanna Co. is interested with a Canadian firm in the development.***

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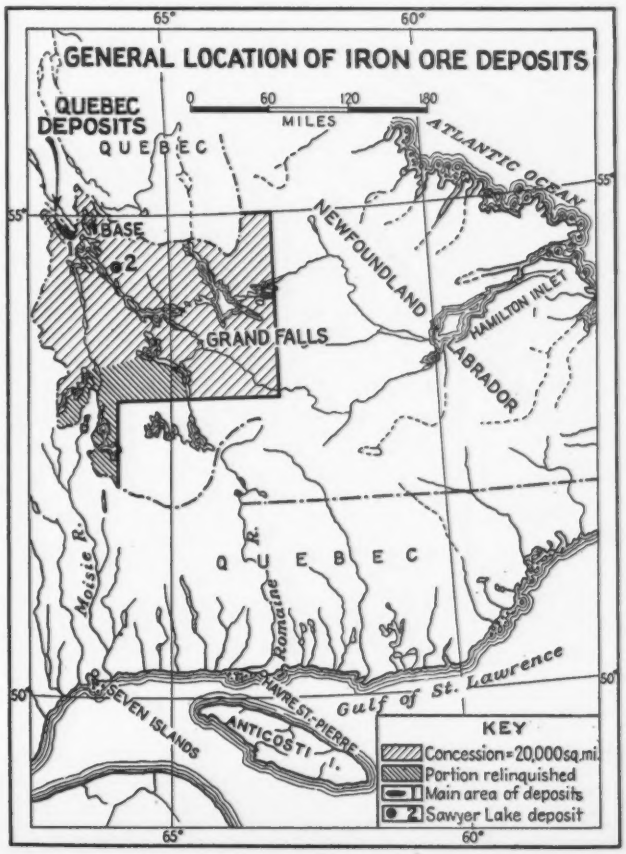


Industrial Briefs . . .

• RED MERCURIC OXIDE — Mercury requirements for the new DPC-owned red mercuric oxide plant at Boone, Iowa, alone will far exceed the total current output of all United States mines. Thus the already broad gap between mercury consumption and production will yawn wider unless west coast mines return to wartime production peaks this summer, or unless imports rise, or both.

Red mercuric oxide, which was a flyspeck on prewar consumption charts, owes its rise to top importance to the jack-in-the-beanstalk growth of the tropical battery program, which the Iowa plant will feed.

• RECTIFIER MANUAL—A manual intended primarily for design engineers who use rectifiers or other sources of direct current in their products has been published by Fansteel Metallurgical Corp., North Chicago, Ill. Principle, properties and construction of selenium rectifiers are fully discussed. Efficiency, regulation, temperature range, voltage and current characteristics, forward and reverse resistance characteristics, ratings at elevated temperatures are reported in detail, with illustrations, tables and curves.

• ON STEEL PANEL — A. M. Tredwell, superintendent of industrial engineering for Sharon Steel Corp., has been appointed alternate on the War Labor Board steel panel. Composed of two public, two industrial, and two labor men, the panel covers 86 companies affected by the WLB's recent decision on wage increases involving premium payments.

• AWARDED CONTRACT—Marlin Firearms Co., New Haven, recently received a contract from the Springfield Ordnance District to produce 10,000,000 20-mm. links and 200,000 20-mm. end links. The links are used on a belt feed for 20-mm. shells.

• SCRAP SAVING—The Glenn L. Martin Co., Baltimore, has discovered a new use for corrugated steel scrap strips. Employees in the finishing and plating department are now using them in various widths and corrugation dimensions to hold small parts while they are being painted in the automatic conveyor sprayers and on the hand sprayer racks.

• POSTWAR PLANS—Steel Sales Corp., Chicago, is planning after the postwar period to expand present facilities in Chicago, Detroit and St. Louis by approximately 50 per cent and also plans construction of three additional warehouses in other midwestern cities.

• EXPORT TRADE — Indicating their confidence in the progress of the war, the British Government has given permission to the Forgrove Machinery Co., Ltd., of Leeds, England, to begin limited production of automatic wrapping machines for export trade.

• TO ERECT CENTER—The War Department has announced authorization for construction of Postal Concentration Center No. 2 at the Oakland Army Base, Calif., to include: Building for use as Postal Concentration Center containing 300,000 sq. ft. of floor space; relocation of present Motor Pool of Camp John T. Knight; and the providing of utilities, including railroad tracks, roadways, street lighting, etc.

The authorized expenditure is in the amount of $2,000,000. Work will be supervised by the San Francisco, Calif., district office of the Corps of Engineers.

• NEW DISTRIBUTORS—Appointment by Gar Wood Industries, Inc., of two new distributors for the products of its hoist and body and tank divisions has been announced by W. H. Hammond, vice-president and sales manager of the divisions. They are General Machinery Co., Spokane, Wash., and Equipos Hobbs S. A., Mexico City.

Inland Breaks Annual Ingot Output Record

Chicago

• • • **For the second consecutive year** Inland Steel Co. broke its annual ingot production record in 1944, Wilfred Sykes, president, told the annual stockholders' meeting recently.

The 1944 output was 3,684,147 net tons, 86,181 tons greater than 1943. The company also rolled 93,858 tons of ingots from other plants.

A new monthly ingot production record was made in March, 1945, when 326,554 tons were produced and a new shipment high also was achieved with 252,000 tons. The shipping record was made in a month in which no purchased ingots were processed, whereas the previous shipping record was made during a month when 13,901 tons of outside ingots were rolled.

An indication that the company may undertake extensive postwar rehabilitation was contained in the statement that "many repairs are long overdue on account of inability to secure material and labor. We have not been able to carry out programs for new construction for the same reason, so that during 1944 we spent only approximately $1,700,000 for additions to all our plants."

In the company's quarterly report, net earnings after all charges for the first quarter of 1945 were placed at $2,472,734 compared to $2,512,396 in the first quarter of 1944.

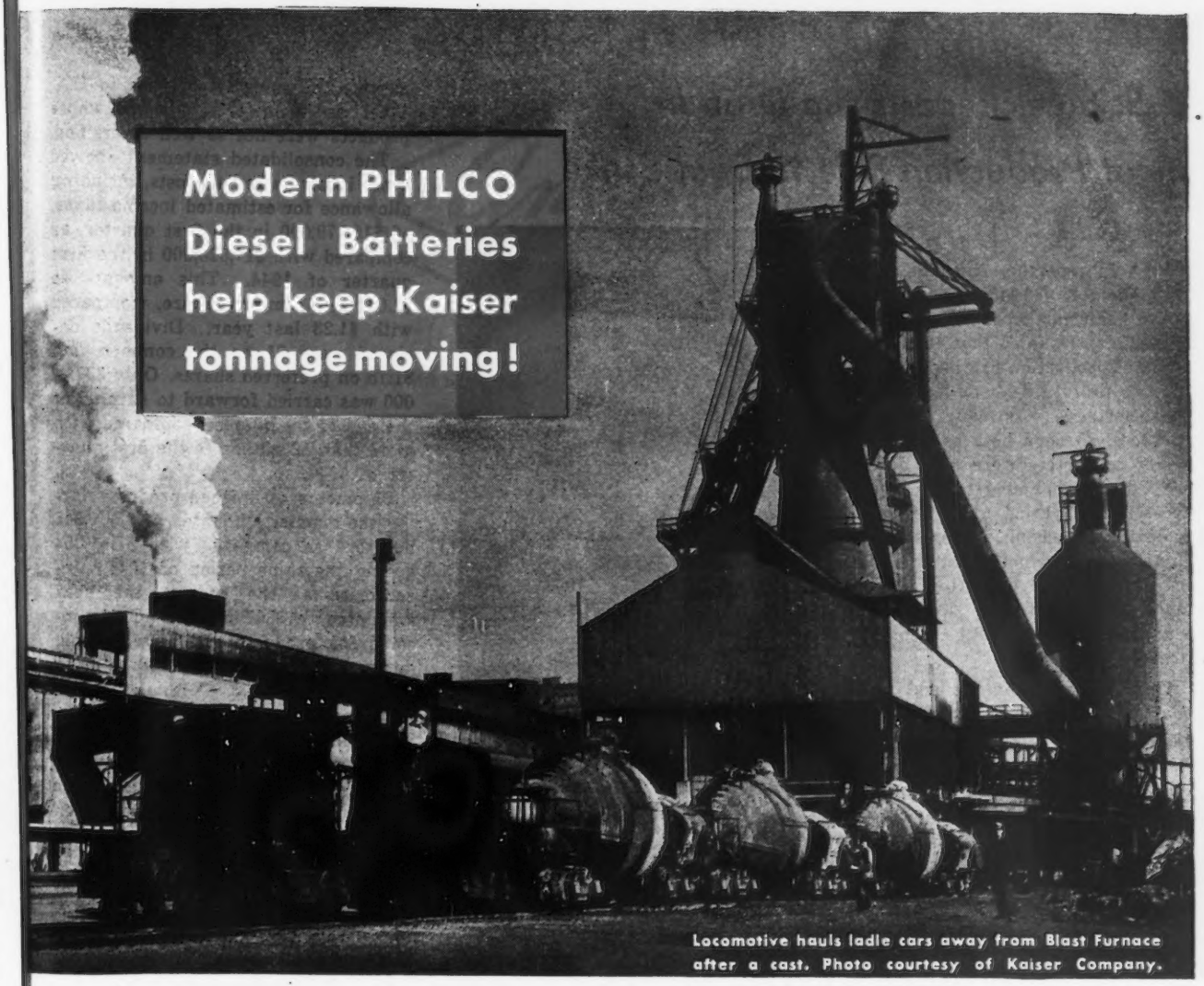
Vogelsang Reports Tin Stocks at 70,000 Tons

Washington

• • • **Erwin Vogelsang,** director of the Tin, Lead and Zinc Division of WPB has stated that the government stockpile of tin amounts to 70,000 tons at the present time, a drop of 35,000 tons from 1942 stocks.

Imports of tin concentrates are expected to drop in 1945 and, since tin recovery from tin plate clippings and old tin cans has declined to 3134 tons in 1944, compared with 4787 tons in 1942, it is anticipated that the tin stockpile will continue to fall.

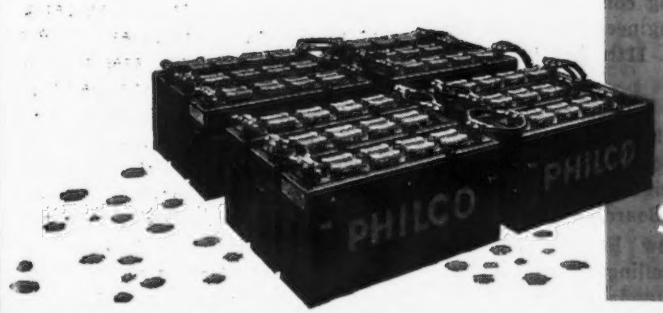
WPB officials expect increased requirements for solder, babbitt metal and other tin-containing metals after V-E Day. However, it is predicted that the reclamation of the mines and concentrators in and adjacent to the Malay Peninsula will take at least two years after recapture.



Locomotive hauls ladle cars away from Blast Furnace after a cast. Photo courtesy of Kaiser Company.

AT KAISER STEEL WORKS, Fontana, California, Philco diesel starting batteries provide dependable starting power for a fleet of 80-Ton G.E. diesel electric switching locomotives. The great advantage of a Philco in such service is its thorough dependability—its extra wallop that always starts a diesel engine immediately. Important, too, are the extra quality features in a Philco, which have widely demonstrated their longer life and lower cost. New Philco Battery catalogs for all services are now available. Write today. PHILCO CORPORATION, Storage Battery Division, Trenton 7, New Jersey. *Makers of the famous Philco "Thirty".*

Typical 56-cell Philco Diesel Starting Battery



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STORAGE BATTERIES

FOR 50 YEARS A LEADER IN INDUSTRIAL STORAGE BATTERY DEVELOPMENT

U.S. Steel Reports Big Drop In Ingot Production Due to Coal Strike

New York

• • • In reporting earnings for the first quarter of 1945, Irving S. Olds, board chairman of the United States Steel Corp. revealed that 104,000 tons of ingot production had been lost during the first 18 days of April due to coal shortages. As many as 12 blast furnaces, 25 open hearths and 4 bessemer converters were shut down in the Pittsburgh-Youngstown-Cleveland areas in that period. Now production of coal is increasing, it was said, with 73 per cent of miners back on the job. All furnaces are operating now and ingot production rose to 88.5 per cent last week from 88.4 the previous week.

Unfilled orders at the end of the quarter were said to be higher than at the end of the year and were estimated to represent 5 to 6 months of capacity production.

Contract cutbacks were said by Mr. Olds to have not yet reached significant proportions and represent merely the replacement of certain types of production by others. Plate requirements are down for the second quarter, which reflects recent Maritime Commission action in modifying its construction program. The Army, Navy and Maritime Commission were said to be jointly reviewing prospective cutbacks with a view toward coordinating their action. The results of their efforts have not yet been revealed to the steel producers who are vitally concerned with the scope and direction of production cuts.

Employment costs during the first quarter totaled $233 million, one million more than in the same period last year. Approximately $12 million additional is chargeable against employment costs during the period, representing the labor value of $31 million more taken from inventory than in the first quarter of last year.

Mr. Olds estimated that the increased yearly cost of labor to the Corporation by reason of the steel wage decision would approximate $35 million. The increased cost in the first quarter was about $13 million. On a tonnage basis, the cost of higher wages will range from 20c. to 30c. per ton, depending on the line of product. In response to a question, Mr. Olds said that the delay in arriving at a decision on adjusted steel prices was not understandable, as the detailed figures required by OPA had long since been supplied. However, the action on this was not considered to assume the same importance to U.S. Steel as to steel producers whose products were not so well diversified.

IRVING S. OLDS: Estimates that steel wage decision will cost United States Steel Corp. $35 million a year.

The consolidated statement showed a net income after all costs, including allowance for estimated income taxes, of $15,379,000 in the first quarter, as compared with $17,028,000 in the first quarter of 1944. This amounts to $1.04 per common share, compared with $1.23 last year. Dividends declared were $1 on the common and $1.75 on preferred shares. Only $371,000 was carried forward to surplus at the end of the quarter, compared with more than $2 million in the first quarter of 1944.

Shipments of finished products during the quarter amounted to 5,001,245 net tons as compared with 5,361,354 during the same period of 1944. Inventories at the end of the year amounted to $307 million. Gross income for products and services sold during the quarter amounted to more than $491 million.

During each of the past four years $25 million has been set aside for estimated additional costs arising out of war. Of this $100 million total, about $4 million had been spent to December 31, 1944. As the balance remaining is considered adequate in the light of present conditions, no additional amount was set aside for this purpose during the first quarter of 1945. This resulted in a decrease of $6 million in the costs for the quarter, which was more than offset by increases in other costs during the period, primarily in employment costs.

New Wage Classifications Set for Design Engineers In Auto and Job Shops

Detroit

• • • A new series of wage classifications affecting approximately 7000 engineering employees in automobile companies, engineering job shops and all manufacturing companies employing designing engineers has been announced by the 11th Regional War Labor Board.

Establishment of the ceiling rates is expected to eliminate labor brokerage and inflated pay checks which have been investigated in the past by the War Labor Board.

Employees now legally receiving more than the ceiling rates will continue on those standards, but no employer now paying less than the ceiling may raise his rate to the top without obtaining WLB approval, and no new hirings can be made above the ceiling rates even though the employer has a higher legal maximum rate.

Spreads of 20 to 30c. are permissible in each rate. The levels range from $1.30 an hr. for detailers in captive shops, up to $2.35 an hr. for product checkers in job shops.

Some industry criticism was registered on certain of the rates. It was pointed out that the low rates for tool and machine detailers in captive shops —$1.30 an hr.—may be sidestepped by designating such men as layout workers at $1.70 an hr. It was also pointed out that the customary 15c. an hr. differential between captive shops and job shops is not maintained in the new schedule, on which some of the lower paid jobs are the same in both types of establishments and on others of which a range of 45c. is specified.

Angier
OF FRAMINGHAM

FOUNDED BY E. H. ANGIER IN 1895

FRAMINGHAM • MASSACHUSETTS

FIFTIETH ANNIVERSARY MESSAGE TO OUR FRIENDS

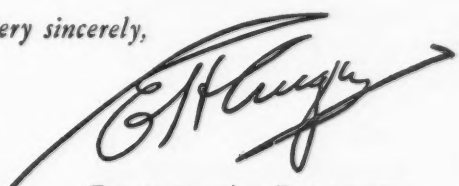
A Half Century isn't so long, after all. Looking back across the years to 1895, it seems but recently that I started a new business at Quincy, Massachusetts — the business from which our present company has developed.

The fact that so many first friends are still with us today (such as the General Electric Company, which placed an order in 1897, two years after we began) is evidence that, in a measure, we have achieved what we set out to do — first, to manufacture "protection" in which shippers would have faith—and second, to maintain a standard of service in which dependence could be placed at all times.

While our entire production of Waterproof, Corrosion Preventive and Building Papers is still devoted 100% to war purposes, we are looking ahead, confident that many of the protective packaging experiences we have had under the stress of war emergencies will be very useful to our friends in the postwar period to come.

It is needless to say that it gives me great satisfaction to have been actively on the job (as I still am today) during the entire span of fifty years. To those whom I know personally, and equally to others who have favored us with their friendship in the form of orders from near and far, I send greetings and best wishes.

Very sincerely,



FOUNDER AND PRESIDENT
ANGIER CORPORATION

1895
TO
1945

Angier

50th. Anniversary

A HALF CENTURY OF PROTECTION TO THE PRODUCTS OF OUR NATION AND ITS INDUSTRIES — IN PEACE AND WAR

Multiple Tank Rocket Launcher Aims 60 Missiles With Travel of Gun

Washington

• • • **The first multiple** rocket launcher mounted on tanks was fired at the Aberdeen Proving Grounds Oct. 27, 1943. At that time, Gen. Gladeon M. Barnes, Chief Research and Development Division, Office of Chief of Ordnance, stated to those present, "History was made when we fired more high explosive in 18 sec. than has ever been done in the history of the firearms." This rocket launcher was composed of 60 4½-in. launcher tubes 90 in. long and was mounted on a M4 tank.

On Sept. 3, 1943, Heintz Mfg. Co. was asked by the Ordnance Department to design and build rocket launchers for use on tanks. No plans or specifications were available. The only information was a pencil sketch showing the rough outline of the turret and body of the tank with 60 circiles draped around the turret together with the oral statement that the launcher was to consist of 60 4½-in. tubes mounted on the top of a tank, controlled and fired from the interior of the tank, connected to the 75 mm. tank gun, so that the launcher could be elevated or traversed by elevating or traversing the gun.

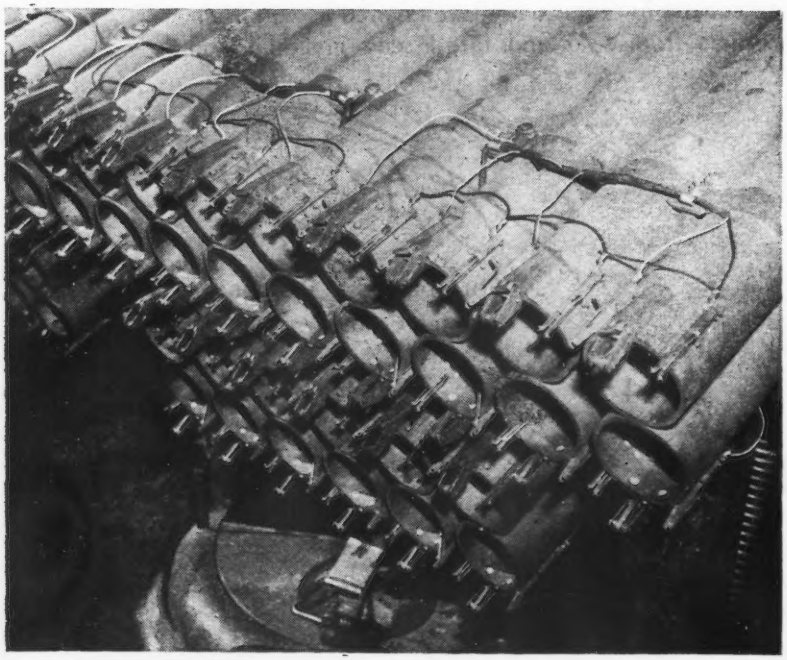
The Heintz Mfg. Co. proceeded with the design of the mechanical and electrical features of this launcher, making use of standard materials and available equipment. The firing tests were so successful that the Heintz Mfg. Co. as a major producer of this piece of equipment has been busy ever since meeting procurement schedules on this and other rocket launching equipment.

The launcher is designed to mount on and be operated from within the turret of the M4 tank. It is loaded from the rear end with 60-4.5 HEM8A1 rockets. It is mounted parallel with the 75 or 76 mm. gun and will traverse with the turret 360 deg. and move in elevation from —7 deg. depression to 30 deg. elevation. Aiming is accomplished by traversing and elevating the 75 or 76 mm. gun. The firing is electrically controlled and either semi or full automatic. The rockets can be launched at intervals ranging from 1/3 to 2 sec. as desired. After all rockets have been fired, the entire rocket launcher and frame may be jettisoned. This is accomplished by rotating the turret 90 deg. until the launcher is at right angles to the direction of travel of the tank, then elevating to 30 deg. or the full travel of the elevating gear and by one complete movement of the three jettisoning dispensors within the tank turret; the holding links are opened and the entire launcher frame jettisoned. Usually the jettisoned launcher is salvaged and made ready for further use.

These launchers are constructed of sheet steel, strip steel, angle steel. Electric welding is used freely in assembling. The firing mechanism and the hydraulic control equipment are mounted inside the tank. One periscope of the standard tank equipment is removed and the hydraulic piping and the electrical control wiring are lead through this opening from the inside of the tank to the launcher frame.

The launchers have affectionately become known to the men in the field as "Calliopes." This rocket launcher has been so successful and satisfactory that the coming months will see many new developments in this field.

CALLIOPE MOUTH: *Sixty rocket tubes mounted together add new fire-power to the M-4 tank. Standard type rocket launching tubes are used, and are jettisonable after the projectiles are fired.*



Gun Turret Orders to Rise

Warren, Ohio

• • • **Despite reports of** widespread cutbacks in war production generally, the Federal Machine & Welder Co. here is expected to get a substantial increase in orders soon for gun turrets, for the Water Buffalo amphibious tanks as a result of the $49,000,000 order given the Food Machinery Corp., of which Federal is a sub-contractor. Some time ago, Federal Machine & Welder received a cutback in its orders for these turrets and it is anticipated that it will take a few weeks before the new orders "sift" through.

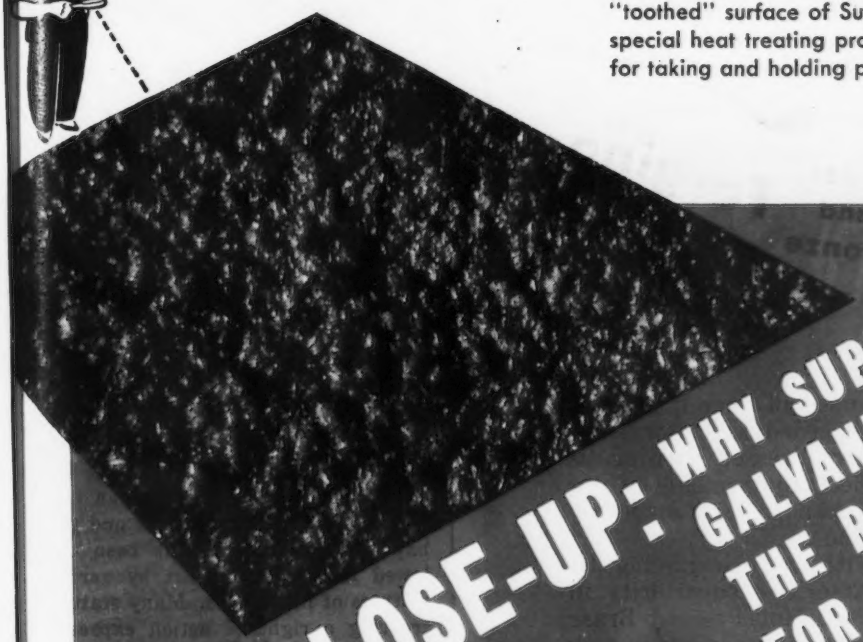
A number of innovations on these turrets for sea-going tanks have been made by Federal. One of these was mounting a 75-mm. gun and perfecting its turret so that it can turn or index 360 deg. mechanically and at high speed. These tanks have been used extensively in Southwest and Central Pacific operations.

Barium Steel Earnings Up

Canton, Ohio

• • • **Consolidated net** earnings of Barium Steel Corp. for the three months ended March 31, were $256,563, compared with $64,079 in the corresponding period of 1944. Results reported are after allowance for depreciation, but before federal income taxes and provisions for renegotiation of contracts. The consolidated earnings include revenue from the operations of Clyde Iron Works, Inc., Duluth, Minn.

This microscopic view, magnified many times, illustrates the "toothed" surface of Superior Galvannealed steel sheets. A special heat treating process produces this ideal foundation for taking and holding paints and fine finishes.



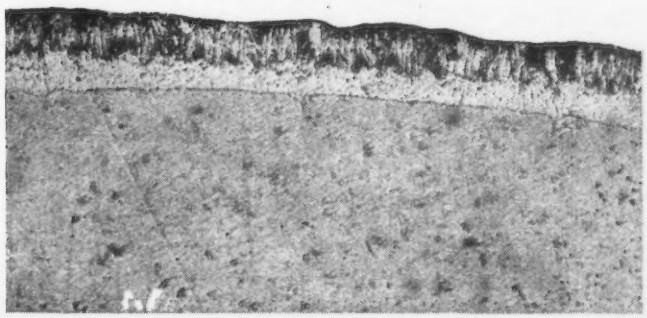
CLOSE-UP: WHY SUPERIOR GALVANNEALED IS THE RIGHT STEEL SHEET FOR MANY APPLICATIONS

Superior Galvannealed
TRADE MARK

The micro-photographs reproduced on this page show Superior Galvannealed's unusual physical properties. They show why this highly rust-resistant, zinc-coated steel sheet "takes" paint and fine finishes readily and "holds" them longer.

The ability of Superior Galvannealed to add lasting good appearance to a product, *and* save time and expense during manufacture, has made it a favorite for many war applications. In peacetime, manufacturers use it for a wide range of products, including refrigerators, heating and air-conditioning units, washing machines, and truck bodies. Write for additional information about Superior Galvannealed.

This microscopic photograph of a cross section of Superior Galvannealed shows the alloy bond between the coating and base steel. This bond guards against rust forming under the paint, and gives extra life to the finish and sheet itself.



CONTINENTAL SUPERIOR STEEL

THE SUPERIOR SHEET STEEL COMPANY - CANTON, OHIO

PRODUCERS OF STEEL SHEETS, including SUPERIOR Galvanized, Tite and Extra Tite Coat Galvanized, CHECKERCOAT, LASTI-KOTE, COPPERIOR (copper steel base), SUPERIOR Galvannealed, SUPER METAL, SUPERIOR Long Ternes (drawing quality), Hot Rolled Annealed, Hot Rolled Annealed Pickled, Pickled Blue, Deoxidized, and Standard Types of Galvanized Formed Roofing.

DIVISION OF CONTINENTAL STEEL CORPORATION • GENERAL OFFICES KOKOMO, INDIANA

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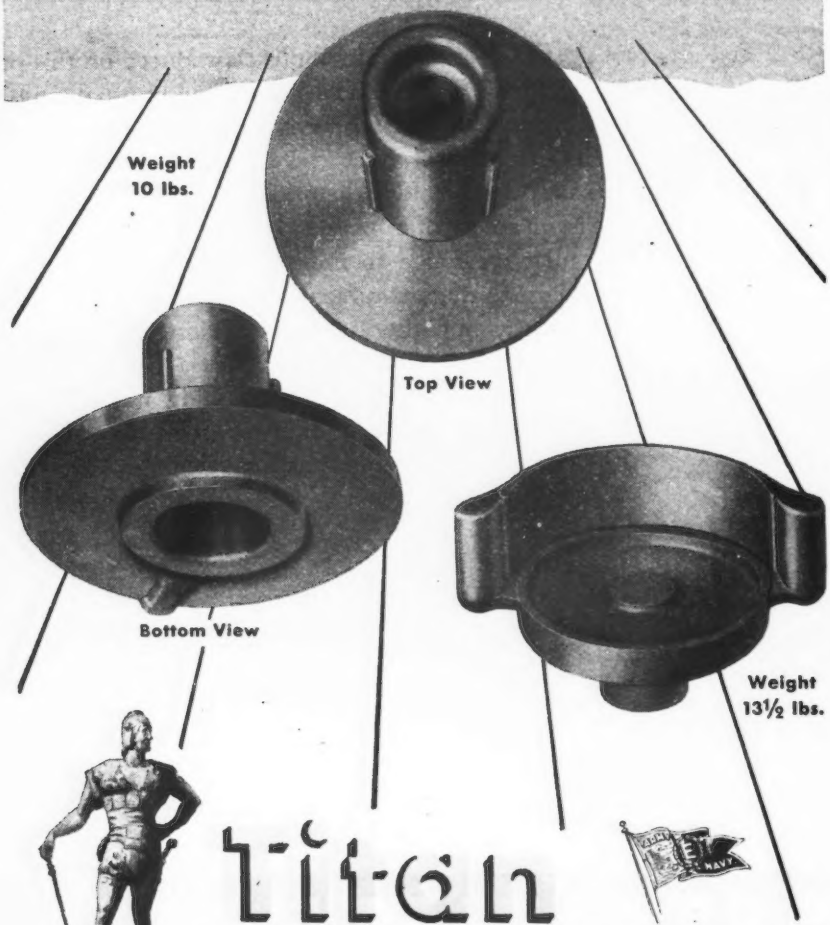
★Titan's Forgings are being used in huge quantities in many types of war materiel needed for victory. Our entire output of the smaller Hot Pressed Forgings is allocated to meet the diversified requirements of our armed services. There is some open capacity for heavy brass forgings (up to 100 pounds).

While we have kept pace with the fast-moving developments responsible for America's superiority in armament, peace will find Titan Hot Pressed Brass and Bronze Forgings readily adaptable for use in new and improved products. They will help meet post-war competition on every count of quality, production, engineering and cost.



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House Bill Would Limit Sherman Act Basing Point Cases

Washington

• • • Designed to cure a defect in the present laws relating to the limitations of actions, H. R. 2788, introduced by Rep. John W. Gwynne, Republican, Iowa, has been referred to the House Judiciary Committee for further action.

Striking at long delays in disputes between the government and private litigants, Representative Gwynne told the House that: "Subjecting an individual to suit on an ancient and perhaps forgotten claim has been outlawed for the most part by various statutes of limitations. Many statutes creating a right of action expressly designate the time within which such action must be brought. Some, however, do not, and the proposed legislation would require such suits to begin within one year after the cause of action accrued.

"Several exceptions are made to this general rule. First, public actions to recover money damages may be enforced if brought within two years after the cause of action accrued except when the United States is not the real party at interest. Second, when an applicable state statute prescribes a shorter period of limitation for the cause of action in question, the period of limitation so fixed by State law will govern."

According to Representative Gwynne, most federal acts creating civil rights of action provide a statute of limitation. However, under at least 10 such acts, no limitation is expressed and in such cases the law of the state in which the action is brought is held to govern. This results in widespread variations. For example, in Maryland an action is permitted under some federal laws to be brought 12 years after the action accrues. The period in other states for similar actions ranges from that period down to six months. Obviously, such variation is not conducive to fair and equal treatment under the law.

Continuing, Mr. Gwynne said: "We not only have limitations of varied lengths in the several states creating discrimination, not only new liabilities springing from novel and retroactive interpretations, but many of these civil actions are for both actual and exemplary damages. Under the Sherman Act, which prohibits things other than the ugly specter of monopoly, a person injured by reason of any-

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STAINLEND HC 25/12 Ac
CHROMEND 25/12 Cb
CHROMEND HCN 25/20
STAINLEND HCN 25/20 Ac
CHROMEND 25/20 Cb
CHROMEND 25/20 Mo
CHROMEND HN 17/25
CHROMEND 29/9
CHROMEND K Mo 18/12 Mo
STAINLEND K Mo 18/12 Mo Ac
CHROMEND K Mo Cb
CHROMEND 18/8 Mo
CHROMEND 8/18
CHROMEND 25/3 Mo
CHROMEND 15/35
STAINLEND 15/35 Ac
CHROMEND 19/9 Cb
STAINLEND 19/9 Cb Ac
CHROMEND 19/9 W Mo
CHROMEND 13/60
CHROMEND 14/75
CHROMEND 20/80
CHROMEND 15/85

ARCOS CHROME GRADES

ARCOS MISC. GRADES

MIXEND
NICKELEND
CHLOREND B
CHLOREND C
BRONZEND E
BRONZEND P
CAREND
REFORMEND
MANGANEND 2M
MANGANEND 13
CUTTEND Under Water Cutting

For many years, metallurgists have recommended chrome-moly steels for high temperature and mild corrosion resistance work.

Their recommendations have generally pointed to the 4-6% chrome ½% moly composition. Fabricating and design engineers, however, have requested properties of metals that would give greater strength and greater corrosion resistance combined with high creep resistance. Arcos Chromend 9M is developed to meet the welding requirements of this grade.

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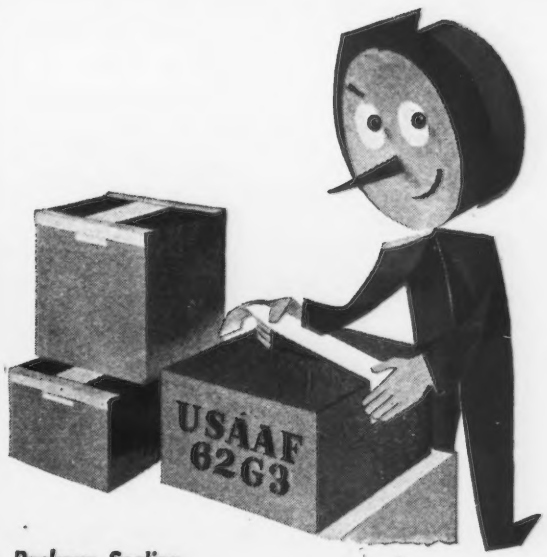
thing forbidden may sue for threefold damages and an action is limited only by whatever may be the law of the forum. In January the Supreme Court rebuffed the Justice Department in its unsuccessful attempt to reinterpret certain patent laws to force compulsory licensing. Had the court approved, thousands of actions for treble damages could have been brought against owners of patents whose practices were questioned only on the basis of a new interpretation of an old law. Further, the same individual would have been liable for various periods under the laws of the several states.

"The Congress has many times refused to outlaw basing point systems of delivered prices. Notwithstanding, the Federal Trade Commission has long attempted to achieve the same result through what the courts have decried as indirection. If the commission is successful in two cases now pending in the Supreme Court, this new interpretation of law by an administrative agency will result in the outlawing of a practice of 50 years standing and will subject thousands of companies and individuals to threefold penalties for periods ranging up to the maximum state statute of limitations.

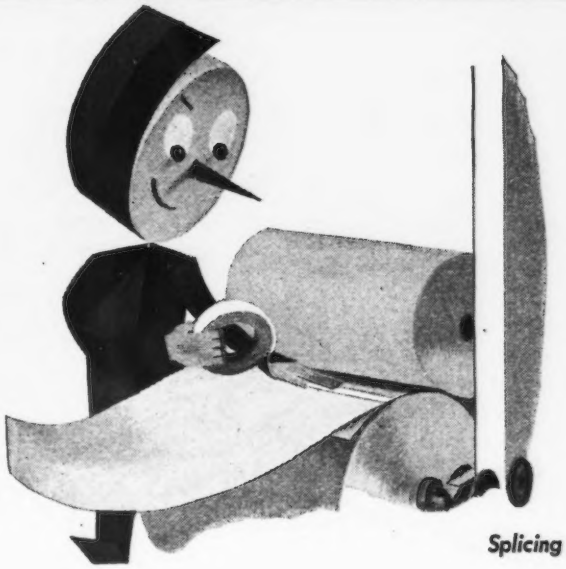
"Similar confusion as to limitations exists under federal laws covering consular fees, public lands, shipping, transportation and labor. Under the Fair Labor Standards Act the concepts of work time, over-all coverage, and the administrator's authority are constantly being enlarged by new interpretation. Each enlargement is given effect as of the date the act became effective. Consequently employers are finding themselves liable for damages, doubled, for events which were lawful when they occurred but unlawful in retrospect. No federal statute of limitation protects them except the varied laws of the states.

As for actual examples, Mr. Gwynne cited a case where the United States District Court for the Northern District of Iowa had before it an action begun in October 1944, for compensation and liquidated damages for overtime services from October 1938, to July 1941. The suit was filed more than three years after the employment terminated and six years after the cause of action accrued. Iowa had attempted to put a reasonable limitation on the time within which an action could be brought under the Fair Labor Standards Act, but because Iowa did not have a state wage-and-hour statute, the district court held that her statute of limitations was invalid as an attempt to legislate in a

Label Protection



Package Sealing



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FILMONIZE is the tape with no tangle, no "curl back," no waste—the tape that seals instantly, without water. FILMONIZE handles faster—stands up better—yet it costs no more.

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MANY STEEL PROBLEMS SOLVED ON J&L-DESIGNED BAR MILL

The versatility of steel—its adaptability and usefulness in countless fields and unnumbered ways in war and peace—is exemplified to a marked degree in this continuous, variable-speed bar mill.

Since this J&L designed mill was put into operation it has produced more than 3,000 different special sizes, weights and designs of steel shapes, including a number of exclusive J&L products that save weight and add strength in all manner of construction projects.

Throughout the war, this mill has been rolling night and day, converting the white-hot billets of steel into shapes useful to the Army, Navy and Maritime services and doing it with the speed and precision that have solved many critical and urgent problems of procurement and supply.

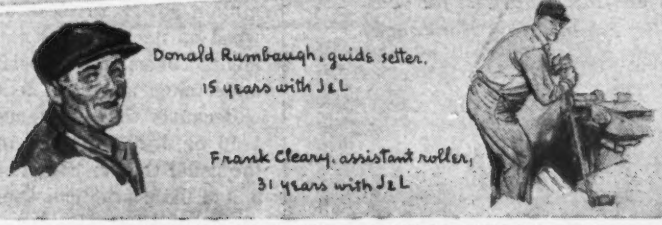
Ready for war, without the costly delays of conversion, this mill is ready for peace, when tank steel will be fashioned into road machinery, LST steel into South Seas traders.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH, PENNSYLVANIA

J&L STEEL

CONTROLLED QUALITY STEEL FOR WAR AND PEACE



FROM AN ORIGINAL DRAWING AND SKETCHES MADE AT J&L ALIQUIPPA WORKS BY ORISON MACPHERSON

(Advertisement)

J&L "JUNIORS"

Jr. beams and channels are patented products of the Jones & Laughlin Steel Corporation. They are structural steel sections literally "Junior" to the well-known heavy structural members. Rolled on the versatile J&L bar mill (see illustration), they afford strength with minimum weight. They are not bent or fabricated, but rolled like their big brothers and are adapted to a great many applications not feasible for the heavier beams. Slit into "T's", they are used extensively by welding to decks and bulkheads as stiffeners in Navy ships, submarines, landing craft and are even utilized in the construction of pontoons by the Seabees. Peacetime use includes service in floors, roofs and stairways of apartments, dwellings, schools and skyscrapers.

Pontoons, "avenues of invasion," the war's most effective unloading apparatus, were devised by U. S. Navy to bridge gap between ships and shores. Built by Seabees, the pontoons were "unveiled" at Sicily, have now spread to every amphibious front. The pontoons are 5 x 7 x 5 ft. cubes. The frame is J&L Junior beams slit into "T's" and covered with steel plates, welded watertight. Pontoon units are used to form causeways, docks and seagoing vehicles. Interlocked as "rhinoferries," and pushed by outboard motors, they ply back and forth, unloading men and material. They are used as unloading docks, as lighters, as ramps, and even as water tanks for troop showers and sprinkling carts in airfield construction.

"Tear drop" steel sections, especially designed by Army Ordnance to form bullet deflectors on tank ventilators, are rolled on this J&L bar mill.

Ships—by initials. If you are confused by invasion dispatches which mention various types of landing ships, here is a partial list of official initials by which these ships are known: LSD Landing Ship, Dock; LST Landing Ship, Tank; LCI (L) Landing Craft, Infantry (Large); LCVP Landing Craft, Vehicle, Personnel; LCM (3) Landing Craft, Mechanized (Mark III); LCT Landing Craft, Tank; LCT (5) Landing Craft, Tank (Mark V); LCT (6) Landing Craft, Tank (Mark VI); LVT Landing Vehicle, Tracked (Unarmored); LCS (S) Landing Craft Support, Small; LSM Landing Ship, Medium; LCR Landing Craft, Rocket. Practically all these types of war craft utilize Junior steel sections rolled on the J&L 14" bar mill.

"Big Boy of the Jungle" is what our troops in the Pacific have named that 20-ton, snorting, clanking, pushing, pulling, never-stopping monster of steel that crashes through the tangle of the jungle to break trails, build roads, construct air fields, haul guns and trucks to the front, the Yankee-invented caterpillar "bulldozer." The Japs hold them in awe. Several steel components of the bulldozer are rolled on the J&L 14" bar mill.

UNUSUAL CASTINGS FOR UNUSUAL SERVICE...

LOWER INGOT MOLD COST PER TON OF METAL

When the Barth Smelting & Refining Works, Inc. used for its ingot molds Absco-Meehanite castings of a Heat-Resisting classification, its mold cost per ton of metal cast was reduced more than 39 percent. This does not take into account additional savings in replacement time because of fewer molds broken on conveyors. Similar economies were effected in single molds cast for the same company.

Absco-Meehanite's ability to resist heat as well as impact is demonstrated by these ingot molds into which bronze and brass in varying formulas is poured at temperatures of 2050°F to 2200°F, a maximum difference being observed of 750°F to 800°F between the inside and outside surfaces of the mold immediately after pouring.

In addition to sustaining this severe heat shock from a continuous succession of sudden heatings and coolings, Absco-Meehanite offers the range of properties listed below. Its four main classifications subdivided into a total of twenty-one types make possible a close matching of the metal to the job it must do.

ABSCO-MEEHANITE
PROPERTIES

1. Strength (Shear, Compressive, Tensile and Transverse)
2. Impact Resistance
3. Corrosion Resistance
4. Wear Resistance
5. Heat Resistance
6. Toughness
7. Rigidity
8. Machinability
9. Pressure Tightness
10. Vibration Absorption

Meehanite castings permit close control of physical properties for your specific application. Write for Meehanite Engineering Handbook.

AMERICAN Brake Shoe COMPANY

BRAKE SHOE AND CASTINGS DIVISION

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field reserved to Congress. The court then applied the Iowa statute of limitation provided for action on contracts, five or 10 years, depending on whether it was unwritten or written.

H. R. 2788 is designed to establish a reasonable time limit on actions created under federal law. It will not affect those actions to which a federal statute already applies. Neither will it affect injunction proceedings nor criminal actions instituted by the government to protect the public interest.

Aircraft Plywood Surpluses Utilized To Crate Supplies

Dayton, Ohio

• • • **Through a curious set of circumstances** involving wood-hulled planes, and the simple process of glueing, the Air Technical Service Command is salvaging materials which will save the taxpayers some $1,260,000.

During the early part of the war, pronounced shortages of steel and aluminum threatened the national defense program and consideration was given to other materials in an effort to alleviate the situation. Wood seemed to be the answer in the aircraft field, and accordingly, the Army Air Forces placed contracts for the construction of wood-hulled planes, made of mahogany and Douglas fir.

The YC-76, a Curtiss-Wright all-wood plane, jocularly called the "Spruce Goose," or "Flying Woodpecker," was the most widely known result. In peacetime it takes at least three years to design, engineer, construct and test a new type plane, but time was a luxury in 1942 which only the enemy could afford and the "Spruce Goose" was rushed to completion in little over a year. Contractors purchased 12,000,000 sq. ft. of hard-wood plywood, some of it mahogany, to use as the skin on the "Goose" and other wood planes.

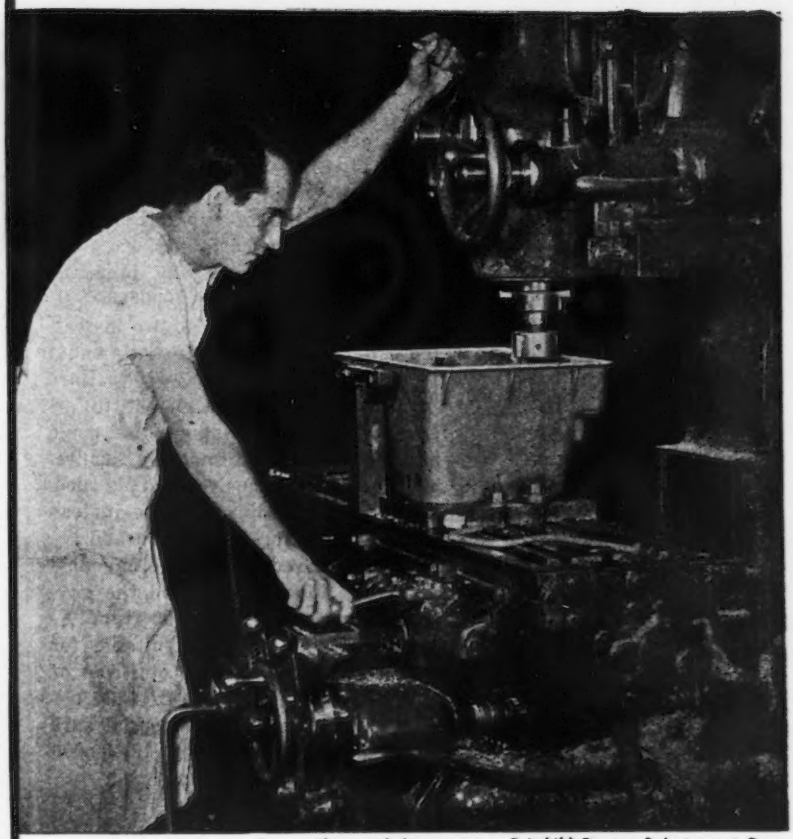
Almost as soon as wood was delivered, the shortage of aluminum ended abruptly, and with it the need for planes such as the YC-76 and YC-62. This left the Army with 12 million sq. ft. of expensive, thin plywood on its hands. Extensive experiments covering its possible use were undertaken at ATSC headquarters.

Because the wood averaged only 1/16 or 3/32 in. thick in contrast to the usual thicker commercial plywood, it had little practical use and its only use, the ATSC decided, would be in

PRECISION AERIAL PHOTOGRAPHY MAPS THE ROAD TO VICTORY...

World War II has seen tremendous strides in aerial photography — potent weapon of modern war. Fairchild Camera and Instrument Corporation has played a leading role in the development and perfection of the precision aerial camera. The Fairchild model presented in this milling story is the K-18 — designed expressly for high-altitude intelligence photography, requiring large area coverage and large image size. Intended primarily for vertical photography, it is also used for low-altitude obliques. Equipped with lens of 24-inch focal length; 9 inches by 18 inches negative size; fully automatic or manual operation.

Fairchild CAMERA



— *Photo and data: courtesy Fairchild Camera & Instrument Corp.*

Milling a film magazine seating surface for the Fairchild K-18 camera with special fly cutter on Milwaukee 3-H Vertical Milling Machine. Material: magnesium alloy; speed: 1500 rpm; feed: 7⅝ inch per minute; cutter: 3-inch diameter with 2 tool bits; larger diameter tool bit: positive rake 20°, helix angle 15°, holder 3 inch, set-in 3½ inch; bottom tool bit: helix angle 0°, positive rake 25°, holder 3 inch, set-in 2 inch (cuts 1/32-inch lower than larger diameter tool bit); path, cutting distances: 20 inches wide x 15 inches across, cutting four sides; supporting wall 3/16 inches thick; 10 minutes milling time.

PRECISION milling of thin walled magnesium and aluminum castings is difficult. Mirror finishes are usually a must, notwithstanding the amount of stock to be removed.

On this Vertical Milwaukee Milling Machine the rate of cross feed is exactly the same as the rate of table feed—resulting in a uniformity of surface and mirror finish over the entire milled area.

Milwaukee Milling Machines are especially adapted for this type of operation. Their three bearing spindle mountings assure smooth vibrationless operation at the sustained high speeds usually used in milling these metals.

TO MILL IT WITH SPEED... PRECISION... PROFIT

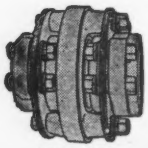
— PUT IT ON A

Milwaukee

KEARNEY & TRECKER CORPORATION
MILWAUKEE 14, WISCONSIN

THOMAS
Flexible COUPLINGS
FOR *any* SPEED OR SERVICE

TYPE DBZ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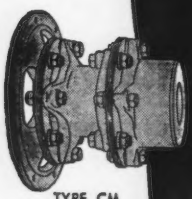
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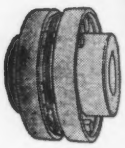
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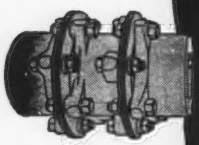
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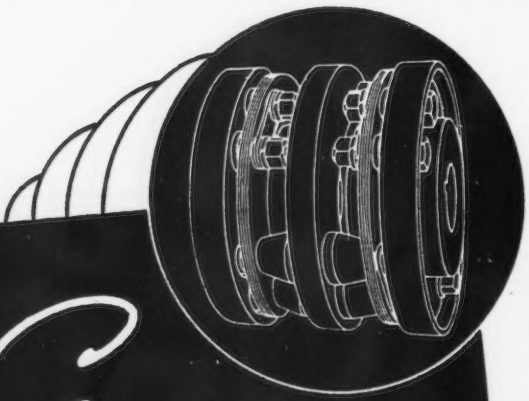

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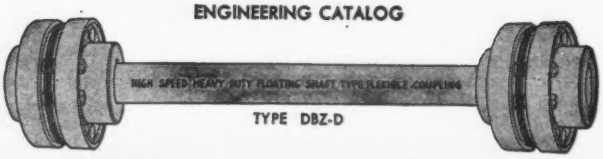
BACKLASH, FRICTION, WEAR AND CROSS-PULL

.....the 4 destructive evils found in all other types and makes of couplings.

NO BACKLASH
NO WEAR
NO LUBRICATION
NO THRUST
FREE END FLOAT

These are the five essential features of Thomas Flexible Couplings that insure a permanent care-free installation.

WRITE FOR COMPLETE ENGINEERING CATALOG



TYPE DBZ-D

TYPE SS

THE THOMAS PRINCIPLE ELIMINATES CHAINS, SPUR GEARS and other VIBRATING MAKESHIFTS

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

conjunction with metal, fabric, or some other wood. Plans were tried and discarded; and, as the production of aluminum continued to soar to astronomical figures, the use of any thin plywood in planes became less necessary or feasible.

Finally the 12 million ft. were offered on the open commercial market. The highest bid for the entire unsorted lot, received from over 100 competing companies, was $40 per thousand ft. Rather than accept that figure, WPB officials determined that no other government agency could use it, and then a salvage plan which not only made use of the wood, but at the same time saved the nation's taxpayers considerably over a million dollars, was found. It was decided to glue the thin plywood on either side of a 3-ply core of inexpensive fir stock and use the resulting product for boxing and crating of supplies and for partitions where hardwood walls are essential. This idea was practical, since the AAF requires 40,000,000 sq. ft. of plywood a month to use in crating supplies and only half that amount is available in soft plywood. Hard plywood has to make up the difference, and this glued-up product could be used to lower the monthly requirement of more expensive hard plywood. As a result, surplus plywood instead of being sold for $40 a thousand ft., was reprocessed at an average cost of $115 a thousand ft., and the government procured 12,000,000 ft. of ½-in. and ⅝-in. plywood, suitable for boxing and crating, at a total cost of $195 per 1000 ft. instead of $300 per 1000 ft.—the cost of commercial hard plywood. The saving on 12,000,000 ft. equalled $1,260,000.

Receives Order For Fifty Diesel Engines

Buffalo

• • • **The Sterling** Engine Co. has received an order for 50 diesel engines from the Whitcomb Locomotive Co., subsidiary of Baldwin Locomotive, according to Addison F. Vars, president of Sterling.

The company reported net profit for 1944 of $331,631, or 74 cents a share, compared with $531,591, or $1.24 a share, in 1943. Sales totaled $16,886,328 against $20,089,449 in the preceding year.

"Although the government is still taking a major part of our production, we are able to make deliveries to industry," Mr. Vars said in his report to stockholders.

GUM STUCK THIS PLANT FOR PLENTY

SUN HYDRAULIC OILS . . . Ended Valve-Sticking in Hydraulic System of Milling Machine. Saved about $360 a Year Per Machine

Often, small changes permit a plant to increase its efficiency, to save money, and to eliminate costly "time-out" periods. This is especially true in specifying petroleum products, for each lubricant or oil must meet the particular requirements of a particular operation. For example:

A manufacturer was machining forgings on a big milling-machine, and ran into trouble with the oil in the hydraulic system that operated the machine.

Valves stuck, and gum had to be cleaned out at regular intervals. Production was being slowed down, and men were wasting valuable hours in cleaning-up machinery.

Gum vanished, and valve-sticking stopped after a Sun Oil Engineer was called in and recommended Sun's Solnus Oil. The oil met the requirements of the job and had to be "added-to" only once in five months. Maintenance-men were no longer tied to this machine. Savings were estimated at about $360 a year.

Wherever oil is used in your plant, whether in hydraulic systems, in machine-tools, in processing textiles, rubber, leather, or other materials; or for lubricating machinery, every oil should be fitted to its particular purpose —the right oil should be put in the right place. Let the skill, experience, and know-how of Sun Engineers help you solve your problems. Just write or call your nearest Sun office or . . .

SUN OIL COMPANY • ***Philadelphia 3, Pa.***

Sponsors of the Sunoco News Voice of the Air—Lowell Thomas

SUNOCO

SUN INDUSTRIAL PRODUCTS

OILS FOR AMERICAN INDUSTRY

Better Steel Making

means

Better Steel CASTINGS

A "STRONG-CAST" CASTING *is one of undivided re sponsibility. Quality is rigidly guarded every step o the way—from watchful chemical and temperature laboratory-checks of each heat, to the careful annealing and cleaning operations on the finished casting.*

This quality control, plus modern steel casting equipment, such as our 25-ton, acid bottom, oil fired, open hearth furnace, are responsible for the high regard in which Strong Steel Castings are held in many vital industries.

It will pay you, in the interest of saving time, trouble and expense to become better acquainted with what Strong has to offer.

STRONG IN NAME
STRONG IN FACT

STRONG STEEL FOUNDRY COMPANY, BUFFALO, N.Y.

Strong

TENSILE STRENGTH · ELONGATION

Reports Increase In Industrial Production For First Part of '44

Cleveland

• • • Greater iron and steel production, chiefly electric furnace grades, has been largely responsible for the industrial production increase during the first two months of this year, according to Brig. Gen. Leonard P. Ayres, noted economist and vice-president of the Cleveland Trust Bank.

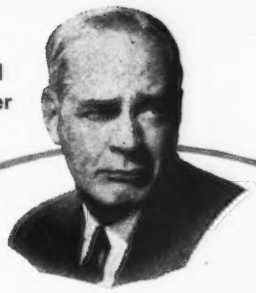
In his monthly business bulletin General Ayres pointed out that passenger automobiles, registered in this country in 1944, were only about 400,000 fewer in number than those registered in 1943, but they were nearly 4,000,000 fewer than those registered in 1941. According to General Ayres, it now appears fortunate that the numbers of new cars added to our automobile population in 1940 and 1941 were exceptionally large. There were nearly 7,250,000 of them, and because they were so numerous, more than a fourth of all our passenger automobiles now in use are still relatively new cars which are capable of furnishing a great deal of transportation before they wear out. It is also fortunate that the number of cars scrapped in 1943 is relatively small.

Commenting on the current car shortage, General Ayres said, "For the first time since early in 1923, there is now a net shortage of freight cars on our railroads. Twenty-five or 30 years ago car shortages were not at all unusual, but in recent years there have been none of them.

During the last war, in 1917, there were car shortages in every month and the average monthly shortage for the year was nearly 100,000. In 1920 the average monthly shortage was about 77,000 cars.

"Car shortages," said General Ayres, "are serious maladies in the railroad business, because when one comes into being it tends to grow and spread like an epidemic of contagious disease. This one was started by bad weather, which blocked railroad yards. The production of goods continued with little interruption and by the time the yards were free there were such large accumulations of freight waiting to be moved that the car shortage continued and increased. In recent weeks, the car surpluses of all Class 1 roads have been about 12,000 cars, while the shortages have been about 18,000 cars, making a net shortage of about 6000."

At present the shortage, which is



General Manager

They look to him

...for the right answer!

Production men in many tool and die plants regard Latrobe's Metallurgical Service as an integral part of their own organization. When unusual problems confront them, involving the selection, performance or heat-treatment of tool steels, they look to the Latrobe Service Man for the right answer. Past experience has taught them to depend upon him for a speedy solution.

Practical knowledge and metallurgical training enables the Latrobe Service Man to give thorough consideration to every phase of the problem, his constant contacts in the field keeping him abreast of latest developments. His services are yours on request, free of any obligation to any user of tool steel.

Tool Room Supt.

Heat-Treat Foreman

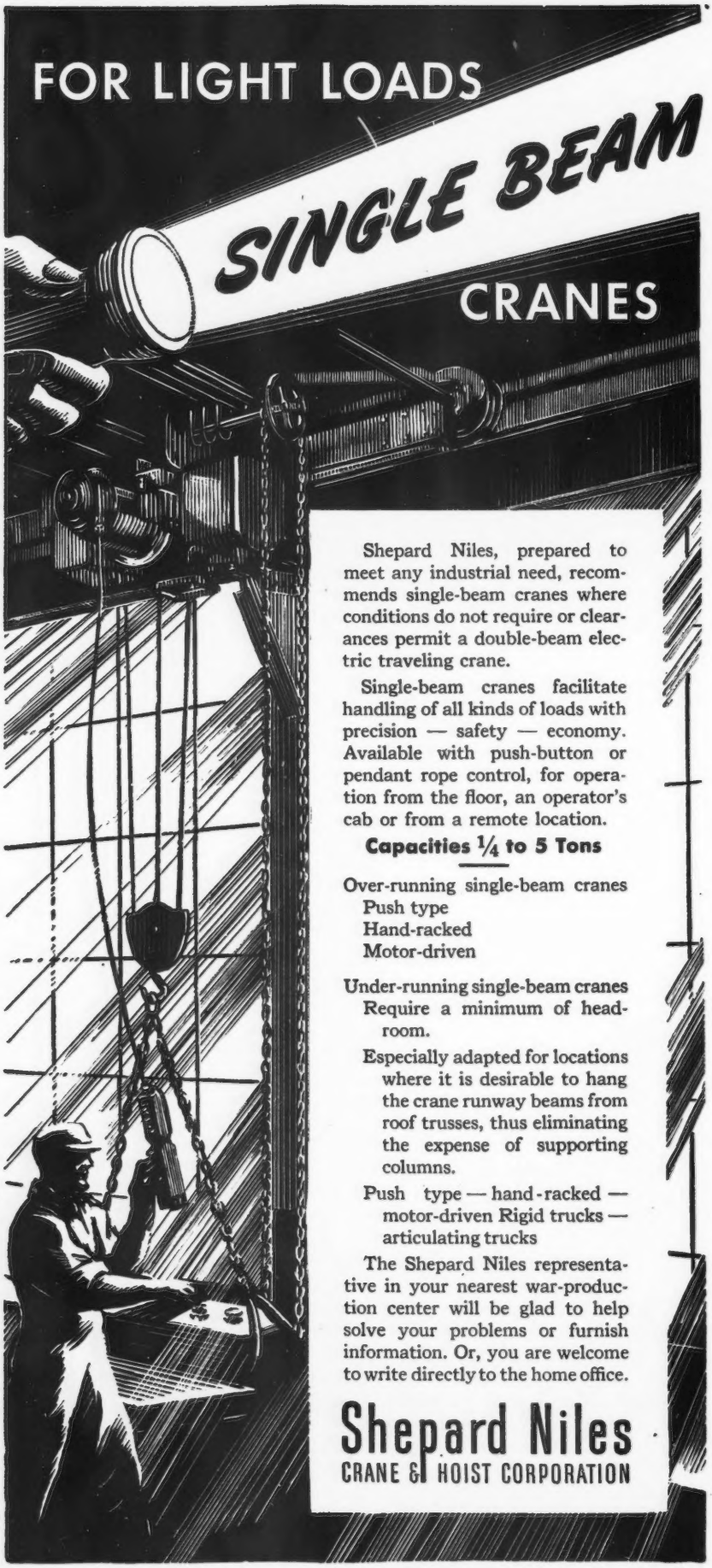
LATROBE *Metallurgical Service*

HIGH SPEED STEELS · DIE STEELS · TOOL STEELS · STAINLESS · LATROBE RED ARROW for metal-cutting tools

S-3

LESCO

LATROBE ELECTRIC STEEL COMPANY · LATROBE, PENNSYLVANIA



Shepard Niles, prepared to meet any industrial need, recommends single-beam cranes where conditions do not require or clearances permit a double-beam electric traveling crane.

Single-beam cranes facilitate handling of all kinds of loads with precision — safety — economy. Available with push-button or pendant rope control, for operation from the floor, an operator's cab or from a remote location.

Capacities ¼ to 5 Tons

Over-running single-beam cranes
Push type
Hand-racked
Motor-driven

Under-running single-beam cranes
Require a minimum of headroom.

Especially adapted for locations where it is desirable to hang the crane runway beams from roof trusses, thus eliminating the expense of supporting columns.

Push type — hand-racked — motor-driven Rigid trucks — articulating trucks

The Shepard Niles representative in your nearest war-production center will be glad to help solve your problems or furnish information. Or, you are welcome to write directly to the home office.

Shepard Niles
CRANE & HOIST CORPORATION

356 SCHUYLER AVE. • MONTOUR FALLS, N. Y.

mostly a shortage of box cars, is most severe in the northwestern and central western states and the most pressing need is for cars in which to ship grain. There are small shortages of flat cars and of coal cars and the net shortages are astonishingly widespread. A recent weekly report showed that 40 different railroad lines or sysems were afflicted by them. It is fortunate that spring has come and warm weather lies ahead, for if this shortage had started last autumn and developed through the winter, our transportation problems by now would have reached truly serious dimensions.

Mysore Steel Works Planning Expansion

New York

• • • **Mysore Iron & Steel Works**, located at Bhadravati Mysore State, India, which was founded in 1923 on a small scale, occupying an area of some 100 acres, and employing about 8000 persons will soon be expanded, according to dispatches from that country.

At the present time the works include: A modern charcoal blast furnace, with a capacity of 80 tons of pig iron a day; a general foundry for making pipe specials and miscellaneous iron castings; two basic open-hearth furnaces, each with a capacity of 25 to 30 tons a day; a rolling mill, with a capacity of between 80 and 100 tons a day; electric furnaces and a steel foundry; a ferroalloy plant consisting of two furnaces; a structural shop for the fabrication of steel structural units; a wood distillation plant; a portland cement and brick plant.

Although the major portion of the pig iron production is converted into steel ingots and fed to the rolling mills, some is used in the foundry for cast iron pipes and other castings. The installation of an additional open hearth furnace for the production of ingots and billets has been approved by the government and orders have been placed for another rod mill as an extension to the rolling mills.

The ferroalloy plant, the first of its kind in India, produces 75 per cent grade ferrosilicon and is equipped to make the country self-sufficient in this raw material which formerly was imported for the manufacture of steel. For the casting of special steel articles, such as axle boxes and anvils, a foundry was installed recently on an experimental basis.

not ferro-alloys alone

IN ANY FIELD of activity where progress is being made, the known is but a small part of the knowable. Text books and manuals are seldom printed until experience has proved the accuracy of the knowledge collected therein. Hasty conclusions set down as gospel can hold up genuine advances, and hinder the scientific spirit. The Ohio Ferro-Alloys Corporation has insisted upon freedom of action for its field service men, knowing that seldom does a problem follow the book in every detail. Questions arise that no one has answered before, but they *must be answered.*

PRODUCTION-WISE TECHNICAL ASSISTANCE

Having chosen men of sound theoretical training and broad practical experience as representatives, we believe their unrestricted, intelligent efforts in cooperation with modern metal-makers will lead to better ferro-alloy practice. In this service Ohio Ferro-Alloys Corporation realizes an ambition to be more than a supplier of consistently uniform products. If you are up against a tough metallurgical problem or development which involves ferro-alloys, we invite you to call on us for production-wise technical help.

FERRO-SILICON
50 • 75 • 85 • 90%
FERRO-MANGANESE
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BOROSIL•SIMANAL
BRIQUETS
SILICON - MANGANESE - CHROMIUM

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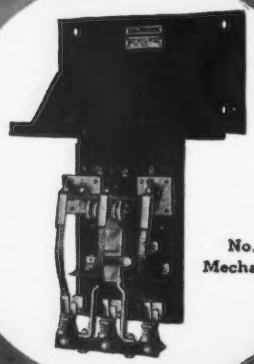
Ohio Ferro-Alloys Corporation
Canton, Ohio

Chicago Detroit Pittsburgh San Francisco Tacoma

E&M PUSH BUTTON

No. 1 ZEO



No. 2 Mechanism

No. 2 ZEO

BULLETIN 1065-A FULL VOLTAGE OIL-BREAK STARTERS FOR 110-550 VOLT MOTORS

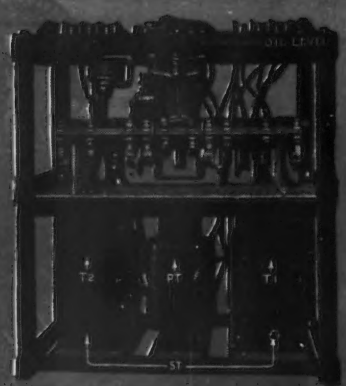
No. 1, 2 or 3 ZEC

No. 1 Compensator-Mechanism

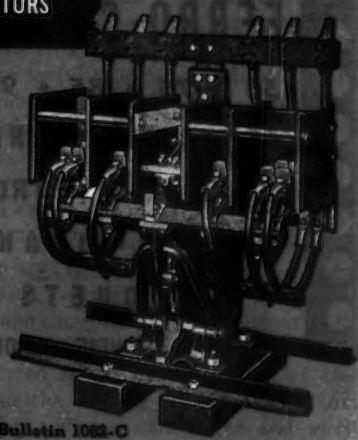
No. 0 ZEC

BULLETIN 1045-B REDUCED VOLTAGE OIL-IMMERSED STARTERS FOR 110-550 VOLT MOTORS

No. 30 ZERC



Bulletin 1047-C Compensator-Mechanism for 2300 Volt Motors



Bulletin 1062-C Contactor for 2300 Volt Motors (50,000 KVA Interrupting Capacity)

STARTERS

FOR CLASS 1 GROUP D HAZARDOUS LOCATIONS

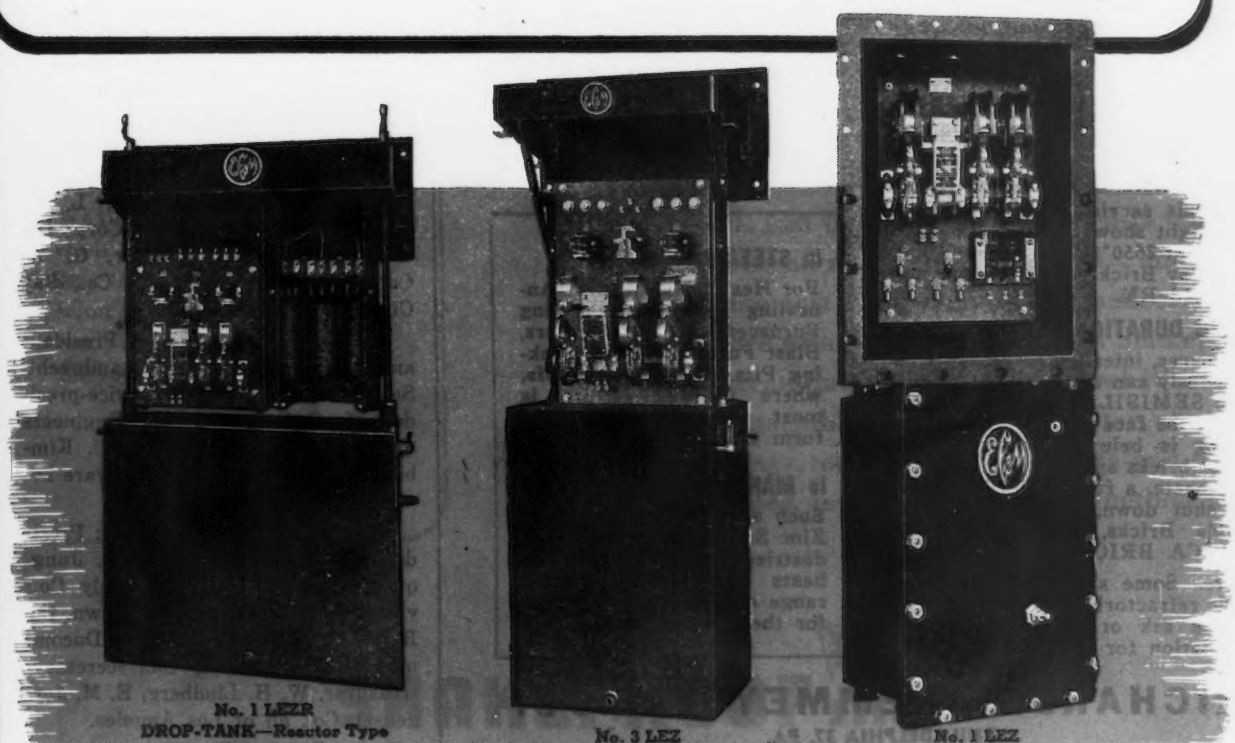
TYPE EO PUSH BUTTON BULLETIN 1105-C
Tested and Listed by the Underwriters' Laboratories for Class 1, Group D Hazardous Locations.

WE make a specialty of building motor control equipment for operation in oil refineries, gasoline plants, paint and lacquer plants, and similar Class 1, Group D Hazardous Locations where highly inflammable volatile substances are manufactured, handled or used.

Pictured on these pages are several forms of EC&M starters for the successful operation of both low and high voltage squirrel-cage motors. Each starter-mechanism is of substantial construction for long periods of operation without attention. Completely enclosed, only an occasional "opening up" for inspection is required.

The Type EO Push Button is without equal for remote control of starters in explosive atmospheres and is also used by many plants for turning lighting circuits on and off in dangerous areas. It is compact, has heavy contacts of simple construction and can be used with or without oil.

Our nearby office will be glad to supply complete information. Specify by individual bulletin numbers or, for a complete set, ask for "Class 1, Group D Literature."



No. 1 LEZR
DROP-TANK—Reactor Type
Booklet 88

No. 3 LEZ
DROP-TANK—Full Voltage Type
Booklet 88

No. 1 LEZ
AIR-BREAK—Full Voltage Type
Bulletin 1067-A

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET — CLEVELAND 4, OHIO

SEMISILICA BRICKS

DURATION OF HEAT AFFECTS REFRACTORIES

Following statements are based on temperature range from 2200° F to 2700° F.

SHORT DURATIONS OF HEAT

Furnaces with daily or shorter firing cycles usually require a good clay or super duty brick.

MODERATE DURATIONS OF HEAT

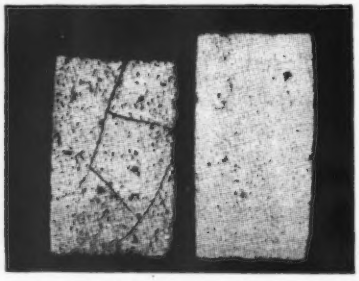
Furnaces with firing cycles of days, weeks or months require refractories which will not vitrify, shrink or spall, from the prolonged heats.

RM SEMISILICA BRICKS are made for this service. The picture at the right shows the results of 24 hours at 2650° F. on a First Quality Clay Brick and the almost unaffected RM.

LONG DURATIONS OF HEAT

Furnaces, intended to be run continuously can safely be lined with RM SEMISILICA BRICKS, provided the face temperature of the lining is below 2700° F. While silica bricks are ideal for continuous heats, a furnace may have to be shut down, which is hard on Silica Bricks, but RM SEMISILICA BRICKS take it easily.

Note. Some slags and gases attack refractories, so if in doubt, please ask or write for recommendation for your furnaces.



Compression, vitrification and spalling of First Quality Clay Brick, and relatively unaffected RM Semisilica brick after a run of 24 hours under heat and load.

In STEEL MILLS:

For Heating, Reheating, Annealing and Heat Treating Furnaces, OH Regenerators, Blast Furnace Stoves, Soaking Pits, etc. In the roofs, where spalling failure is most prevalent, they perform their greatest service.

In MANY INDUSTRIES:

Such as Chemical, Ceramic, Zinc Smelting and other industries where continuous heats in the temperature range of RM's are required for their processes.

RICHARD C. REMMEY SON CO.

PHILADELPHIA 37, PA.

REMMEY

Warehouse Association Announces Officers Of Several Chapters

Cleveland

• • • **New officers, elected for the coming year by the following chapters of the American Steel Warehouse Association, were announced by Walter S. Doxsey, association president. They are:**

Baltimore Chapter: President, Arthur M. Pfeiffer, Dietrich Bros., Inc., Baltimore; vice-president, Harold Dell, John J. Greer & Co., Inc., Baltimore; secretary-treasurer, J. D. Boan, U. S. Steel Supply Co., Baltimore; and chapter director, George J. Parke, Eagleston-Parke, Inc., Norfolk, Va.

Central States Chapter: President, L. B. Worthington, U. S. Steel Supply Co.; vice-presidents, E. B. Fisher, National Steel Co., and A. E. Kuby, Standard Steel & Wire Corp.; secretary, T. B. Daniels, Jones & Laughlin Steel Corp.; treasurer, D. F. Grace, Chicago Steel Service Co.; and chapter director, H. V. Douglas, Central Steel & Wire Co., all of Chicago.

Colorado Chapter: President and chapter director, H. V. Waterman, Hendrie & Bolthoff Mfg. & Supply Co.; vice-president, J. H. Singleton, C. A. Crosta, Inc.; secretary-treasurer, A. M. Hays, Hendrie & Bolthoff Mfg. & Supply Co., all of Denver.

Detroit Chapter: President, T. L. Parker, Edgar T. Ward's Sons Co., Detroit; secretary-treasurer, L. M. Craig, Steel Plate & Shape Corp., Detroit, and chapter director, G. W. Cooke, Jennison Hardware Co., Bay City, Mich.

Intermountain Chapter: President and chapter director, H. P. Lambrecht, Salt Lake Hardware Co.; vice-president, L. S. Packman, Steel-Engineers Co.; secretary-treasurer, H. C. Kimball, Z.C.M.I. Wholesale Hardware Division, all of Salt Lake City.

Southern California Chapter: President and chapter director, E. Jungquist, Percival Steel & Supply Co.; vice-presidents, William L. Rawn, the R-J-M Co., and Wayne Rising, Ducommun Metals & Supply Co.; secretary-treasurer, W. H. Lindberg, E. M. Jorgensen Co., all of Los Angeles.

Texas Chapter: President and chapter director, R. L. Philips, Peden Iron & Steel Co., Houston; first vice-president, W. C. Jaschob, Briggs-Weaver Machinery Co., Dallas; second vice-president, J. H. Maxwell, Maxwell Steel Co., Fort Worth; secretary,

See

HOW MUCH YOU CAN SAVE

With

SHAKEPROOF

THREAD-CUTTING SCREWS

- *Eliminate Tapping!*
- *Speed Assembly!*
- *Reduce Costs!*

SEND FOR FREE TEST KIT!

Drive these screws yourself. Watch them actually cut their own threads easily in any thickness of metal. See what a snug, tight fastening each screw produces. Write for your Test Kit No. 22, today!

It's simple! Just figure what tapping costs you per thousand machine screws used—and don't forget to add the cost of taps and maintenance. These costs are what you eliminate with Shakeproof Type 1 Thread-Cutting Screws. And, what's more, you save vital assembly time and get tighter, stronger fastenings, too! Get complete data and prices on this faster, lower cost assembly method now!

ARMY-NAVY

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Fastening Headquarters

Distributor of Shakeproof Products Manufactured by ILLINOIS TOOL WORKS

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In peace or in war, since 1913, United Welding has been on the "front line" of welding fabrication. With their excellent equipment, experienced engineers and 32 years of background, United is well qualified to "meet and conquer" any fabricated welding problem.

Whether your weldments are complete products or only parts thereof, whether they are large, small or complicated, they can be produced at United rapidly and economically.

United's engineers are available for consultation. Write them today. Quotations upon request.

ARMY E NAVY

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WELDING FABRICATORS OF MODERN DESIGNS
SINCE 1913

N. A. Fitch, National Steel Products Co., Houston; and treasurer, V. P. Williams, Markle Steel Co., Houston.

Wisconsin Chapter: President, Carl Gallauer, U. S. Steel Supply Co.; vice-president, George Heiden, Shadbolt & Boyd Co.; secretary-treasurer, Reimar A. Frank, A. M. Castle & Co.; and chapter director, John Pritzlaff, John Pritzlaff Hardware Co., all of Milwaukee.

Northern California Chapter: President (re-elected), Howard M. Tayler, Tayler & Spotswood Co.; vice-president, Curtiss Hayden, Dunham, Carrigan & Hayden Co.; secretary, R. D. Cortelyou (re-elected); and chapter director, Hugh E. Oliphant, Tay-Holbrook, Inc., all of San Francisco.

"Beach Buster" Powered By Modified Cadillac Engines

Detroit

• • • **The LVT-3** better known as the "Beach Buster" used for invasion service at Okinawa, has been revealed here as powered by Cadillac V-8 engines and hydromatic transmissions. These engines are standard Cadillac automobile engines with minor changes. Two are used, mounted in the rear, and connected by a variable differential.

The Beach Buster was designed by Cadillac and Borg-Warner engineers working with the Navy Bureau of Ships. It is produced by Ingersoll Steel & Disc Division of Borg-Warner Corp., Kalamazoo, Mich. It handles 10,000 lb. of cargo or 50 fully equipped men.

Cadillac has been allowed to say that it has produced "thousands of engines and transmissions" for Beach Busters. The engine is the same which Cadillac has installed in more than 10,000 other combat vehicles, including the M5, M8 and M24 tanks, slightly varied to fit the different usage.

February Truck Output Drops

Detroit

• • • **Truck production for** military and civilian use during February was estimated to total 64,569 units in a preliminary figure issued by the War Production Board. This compared with 65,864 completions during January. In both cases, approximately 14,100 civilian trucks were included.

First light civilian truck production was turned out during February, with 161 such units.

Over 5,000,000 fuses heat treated—

NO DISTORTION!

Cutaway sections of fuses made from SAE 4140 steel show plainly the heat treating problem. Irregular sections, thin and thick, plus square corners, are invitations to distortion or cracking.

Yet more than five million of these fuses have been heat treated by an "Interrupted" quench in Houghton's Mar-Temp Salt, without any rejection attributable to the heat treatment. Writes the heat treating supervisor in summing up results:

"The total number of pieces run, the quality of the work, and our ability to maintain production for 24 hours a day, seven days a week, I would say is quite a compliment for Houghton's Salt."

The heat treatment follows finish machining. Not only has this method eliminated quench cracks, but it also has reduced the time required for a complete cycle from 3 hours to 48 minutes. The method includes:

Preheat—open flame

High heat in Liquid Heat at 1550° F.

Quench in agitated Mar-Temp Salt at 625° F.

Draw in Draw Temp at 850-900° F.

Each step requires 12 minutes. One complete rack of 20 fuses comes off the line every 3 minutes. Production is double the original estimate, which speaks very well for salts, furnaces and the whole process.

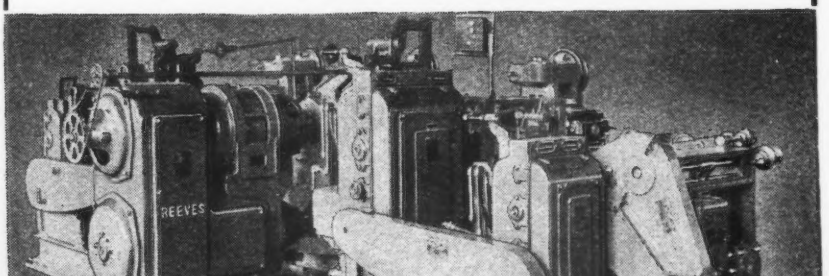
Martempering, austempering or isothermal quenching in salt may be your answer to a present problem. Let's talk it over. E. F. HOUGHTON & CO., 303 W. Lehigh Avenue, Philadelphia, and all principal cities.

SALT-QUENCH IN HOUGHTON'S

MAR-TEMP

Maintain Constant Tension and Velocity

WITH REEVES SPEED CONTROL

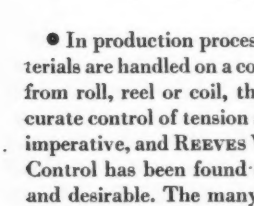


● In production processes where materials are handled on a continuous basis from roll, reel or coil, the need for accurate control of tension and velocity is imperative, and REEVES Variable Speed Control has been found most practical and desirable. The many sizes, designs and speed ratios of the three basic REEVES units simplify these installations to the very minimum of time and expense.

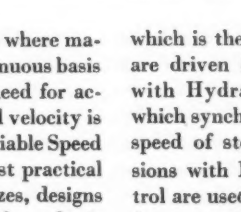
Pictured above is a triple tandem rolling mill built by Waterbury-Farrel Foundry & Machine Co., for flattening wire of many different sizes. Operating speed for best production for each dimension of wire being worked, is selected through a REEVES Motodrive, which is the master drive. Two stands are driven by REEVES Transmissions with Hydraulic Automatic Control which synchronize speed of stands with speed of stock. Two more Transmissions with Hydraulic Automatic Control are used, one to set tension in wire from pay-off roll and one to maintain same tension on windup roll. The third stand is driven directly by the master Motodrive.

REEVES speed adjustability, available in manual, electric remote or completely automatic controls, is the answer to a large number of production problems. Tell us what you want to accomplish. Nation-wide staff of speed control engineers to serve you.

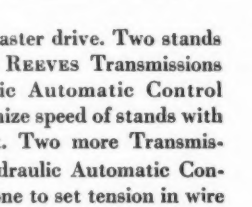
REEVES PULLEY COMPANY • *Dept. I* • COLUMBUS, INDIANA



VARIABLE SPEED TRANSMISSION for providing infinite, accurate speed flexibility over wide range—2:1 to 16:1 inclusive.



VARI-SPEED MOTOR PULLEY converts any standard constant speed motor to a variable speed drive within 4:1 ratio.



MOTODRIVE combines motor, speed varying mechanism and reduction gears in single unit. Speed ratios 2:1 to 6:1 inclusive.

Company's Earnings In '44 Higher; Sales Drop

Buffalo

• • • **The Electro Refractories & Alloys Corp.** earned $131,997, or $1.53 a share, in 1944 as compared with $109,332, or $1.27 a share in 1943, although sales dropped from $4,174,882 to $3,557,901.

Grant S. Dimond, president, explained the improvement in net income was the result of a "windfall" through a change in the New York State franchise tax law which enabled the company to deduct two years' franchise taxes in computing federal income taxes.

C. D. Dyer, Jr., president of Dyer Engineers, Inc., Cleveland, Joseph N. Moorhead, works manager of the American Magnesium Corp., Buffalo, and Oliver A. Weppner, vice-president of the Marine Trust Co., were elected to the directorate.

Sees No Reconversion Problem for Company

Buffalo

• • • **The Buffalo Bolt Co.** is faced with no reconversion problem whatever, Rudolph B. Flershem, president, declared in his annual report to stockholders showing the company had net profit of $425,815, or $1.24 a share, in 1944, compared with $341,882, or $1 a share, in 1943. Sales were at the new record peak of $9,166,276 against $9,076,161 in 1943.

"Although concentrating on the immediate task of gearing its output to the needs of the armed services," said Mr. Flershem, "Buffalo Bolt is giving considerable thought to projects designed to fortify its position in the postwar period. Our company faces no reconversion problem whatever, since the items which it now produces are the same as those which it made before the war."

Copper Imports From Rhodesia

Washington

• • • **The British Government** has made 30,000 tons of Rhodesian copper available to the United States during the first quarter of the year and has agreed to supply an additional 42,000 tons during the second quarter, according to Federal Economic Administrator Leo T. Crowley. The latter consignment is part of a total of 175,000 tons that the U. S. has requested during the remainder of the year.

Machine Tool Display Draws Large Group

Springfield, Ill.

• • • **Display for sale of 8617 machine** tools and 1155 miscellaneous pieces of production equipment here recently under Reconstruction Finance Corp. surplus disposal auspices attracted 750 prospective buyers.

All of the equipment was in original crates. About 40 per cent was on the critical list, the balance being available for general use. No purchases were consummated on the grounds. Offers to purchase in accordance with OPA regulations were submitted to RFC's Chicago office, with acceptance to be made after April 25. Purchase prices were expected to follow closely the standard machine tool surplus price schedule.

Most of the equipment was relatively lightweight and general purpose with a total cost value of approximately $2,000,000. Included were 784 arbor presses, 2181 drill presses, 245 lathes, 3248 grinders, 286 woodworking machines and various machinery for foundries.

Sees Increased Steel Use in Postwar Years

Buffalo

• • • **Bright prospects** for the steel fabrication industry for at least five years after the war were predicted by Carl Blim of Utica, a director of the American Institute of Steel Construction, at a meeting of the New York State Steel Fabricators Association, Inc., in Buffalo.

"Deferred plant conversion jobs, planned public works jobs and construction of new bridges will offer to steel fabricators the largest amount of business in their history," Mr. Blim declared.

Steel will continue to play the leading part in construction work, despite the wartime growth of other materials, he forecast, and welding in building will increase and eventually be used more extensively than riveting.

The fabricators adopted a resolution proposing that field painting on structural steel be eliminated from steel contracts, on the ground that the work belongs to another trade. The resolution will be presented to the American Institute of Steel Construction with the recommendation that the latter eliminate from the code of standard practice any reference to steel painting.

Morton's
SALT TABLETS

NOW AS FAMILIAR AND NECESSARY AS THE DRINKING FOUNTAIN . . . .

Only a few years ago, the drinking fountain stood alone. Today, in practically all leading industrial plants, it has a partner, the salt tablet dispenser. For, wherever men work—and sweat — water and salt go together.

Salt is a balance wheel in the human body. It keeps body fluids in equilibrium and gives tone to the blood. When salt is lost the body becomes dehydrated and the blood thickens. The result is Heat-Fag, lassitude, inalertness. Production suffers and accidents increase.

The easy, simple, sanitary way to replace the salt lost through sweat is with Morton's Salt Tablets. It costs less than a cent a man a week to have them available at every drinking fountain.

In salt tablets, as with other grades and types of salt, Morton is the recognized leader. Order Morton's Salt Tablets and Dispensers from your distributor or directly from this advertisement. Write for free folder. Morton Salt Company, 310 South Michigan Avenue, Chicago 4, Illinois.

MORTON'S SALT TABLETS

Morton's Salt Tablets are available either plain or with dextrose.

Case of 9,000, 10-grain salt tablets - - - - - - $2.60

Salt Dextrose Tablets, case of 9,000 - - - - - $3.15

MORTON'S DISPENSERS

They deliver salt tablets, one at a time, quickly, cleanly—no waste. Sanitary, easily filled, durable.

800 Tablet size - - $3.25

MORTON'S SALT TABLETS

ANOTHER ENGINEERING TRIUMPH

Cleaning and lacquering this 81-millimeter trench mortar shell were delicate operations. In its making, the shell had to be cleaned between each draw. Then, between final rinse and lacquering, *no rust could be allowed to form.*

"How are these jobs to be done?" makers of the shells wondered. Oil couldn't be used to prevent rust—lacquering can't be done over oil. Specifications did not permit a "phosphatizing" operation.

Wyandotte Chemicals Corporation gave the answer with two of its specialized products—a cleaner and a rust preventive. The shells were treated right after the last draw with a special Wyandotte rust preventive. Merely as an experiment, a shell was let stand 30 days, without lacquering. At the end of that time there was not a speck of rust on the metal!

This Wyandotte rust preventive is a powder. It leaves no film on the surface of the metal but literally passivates the steel, thus effectively preventing rust.

Whatever *your* metal cleaning need may be, you are almost sure to find a Wyandotte Product to meet it. Ask the Wyandotte Representative for advice.

Wyandotte
Reg. U. S. Pat. Off.

Wyandotte Chemicals Corporation

J. B. Ford Division
Wyandotte, Michigan

SERVICE REPRESENTATIVES IN 88 CITIES

Reports Earnings Of Republic's Chairman

Cleveland

• • • **Tom M. Girdler,** chairman of the board of Republic Steel Corp., was paid $275,000 in 1944 by the corporation, but Consolidated Vultee Aircraft Corp., which also employs Mr. Girdler as chairman, paid Republic $137,500, or half of the total amount.

This was revealed in a proxy statement sent to Republic shareholders in preparation for the annual shareholders' meeting at Flemington, N. J.

The statement reported Mr. Girdler will also get retirement benefits estimated at $44,400 yearly at a retirement age of 68, but if he does not retire until 70, this would be increased to $50,000 yearly.

Rufus J. Wysor was paid $196,000 as president, and his retirement benefit will be $36,000 annually, according to the statement. Other officers and their last year's salaries are: Charles M. White, vice-president in charge of operations, $133,000; Norris J. Clarke, vice-president in charge of sales, $133,000; Pearce F. Boyer, vice-president and comptroller, $64,166; Donald B. Gillies, vice-president, $47,000; W. W. Hancock, vice-president, secretary and treasurer, $64,166; Thomas F. Patton, general counsel, $47,500.

The report also said Republic employs 34 officials getting between $20,000 and $50,000 annually and one receiving from $50,000 to $100,000, his exact salary being $66,250.

Output of Bomb Fuse Cans Tripled in 1944

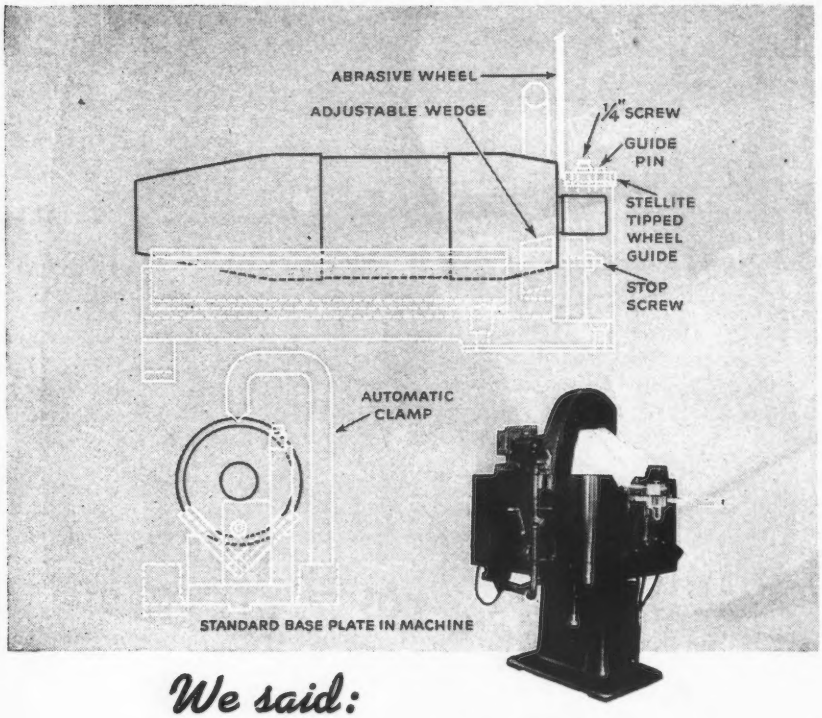
New York

• • • **Continental Can Co.** tripled its output of bomb fuse cans during 1944 as compared with 1943, according to J. F. Egenolf, vice-president in charge of manufacturing. These cans are produced in the same plants that formerly made metal containers for coffee, talcum powder and scores of other civilian products.

Just before a bomb is loaded on a plane, one of the cans is opened, and the fuse is taken out and screwed into position on the bomb nose. Not until then is the bomb "activated."

The cans come in many sizes; they are all key-opening, and have metal collars fixed inside to hold the fuses snug. It is estimated that fuses packed in these hermetically sealed containers will keep in good condition for at least 20 years.

WHERE THERE'S TOUGH WEAR
THIS IS THE RACO WAY—
RACOLLOY MANGANESE
AUSTENITIC MANGANESE STEEL ELECTRODES
RACOLLOY Manganese heavily coated steel electrodes are used for repairing broken or worn austenitic 14% manganese steel parts and for applying deposits of manganese on mild steel.
The deposits are equal in toughness, wear-resistance and work hardening capacity to cast or wrought manganese steel. Moreover, since these electrodes contain nickel to prevent brittleness, the deposits withstand severe shock.
Among the applications for RACOLLOY Manganese are rock crusher jaws, pumps, dredge buckets, railway frogs and similar spots subject to rough treatment.
OTHER RACO HARD SURFACING ELECTRODES:
RACO 25—Heavily coated; for building up worn parts and surfaces on which a tough machinable deposit of moderate hardness is needed.
RACO 45—Heavily coated; for surfaces that require no machining, but must withstand severe wear and abrasion.
RACO 55—Heavily coated; for building up surface of extreme hardness and wear-resistance.
★
These electrodes are identical with all RACO products—precision made and of best materials to give finest performance.
The REID-AVERY COMPANY
INCORPORATED
DUNDALK • BALTIMORE 22 • MARYLAND
SINCE 1919 PRODUCERS OF ARC WELDING ELECTRODES AND WELDING RODS



We said:

"WHY NOT CUT IT ABRASIVELY?"

and here's what happened:

PROBLEM: To remove boss from closed end of shells. Conventional methods would require a second operation to finish end after removal of boss.

SOLUTION: CAMPBELL engineers recommended Model 213 Hydraulic with a simple fixture as shown in drawing. Facing tool makes undercut on boss to guide wheel through cut. Guide eliminates flutter in wheel. Shell is fed to work stop in fixture. Single hydraulic control handle operates clamp, and controls up and down feed of wheel. No special skill required by operator.

RESULT: Finished cut in one operation. Additional finishing operation eliminated. Wheel contact time for 1 inch boss—6 seconds. Fixture reduces handling time to a minimum. ★ ★ ★

Perhaps your cutting problem is not as simple as this one. We are constantly adapting CAMPBELL machines for unusual jobs—or to do ordinary jobs faster, better or at lower cost.

WHY NOT DO THIS? *Write and tell us (1) the range of sizes, (2) kind of material, (3) length of cutoff pieces, (4) length of stock before cutting, (5) tolerance for length of cut pieces and (6) hourly production requirement. With this information,* CAMPBELL *engineers can recommend production procedure and work up cost sheets for you.*

Campbell

ABRASIVE CUTTING MACHINES

ACCO

ALSO MAKERS OF A COMPLETE LINE OF NIBBLING MACHINES

ANDREW C. CAMPBELL DIVISION
AMERICAN CHAIN & CABLE
BRIDGEPORT, CONN.

ACCO TRADE MARK

Proposed Polish Plan Would Add Economic Strength to Country

New York

• • • If Poland's borders are extended westward, as contemplated by recent proposals, the small nation's industrial importance would be more consequential than ever, according to the American Iron & Steel Institute.

If that should happen, Poland presumably would get part of Silesia, now occupied by the Russian Army. Silesia contains extensive deposits of high-grade coal, zinc, lead, and low-grade iron ore. Just before the war Silesia accounted for around one-third of Germany's coal, about 15 per cent of its coke, and 40 per cent of its lead. The district contained numerous German arms factories, foundries, oil refineries and chemical works. Steel production in recent years in Silesia has been variously estimated from 2,000,000 to 5,000,000 tons per year.

Mineral reserves of prewar Poland include coal, limestone, dolomite and lean iron ore. During the First World War, mining in Poland was interrupted, and most of the nation's industrial production facilities were destroyed. By 1926, however, extensive industrial reconstruction and the stabilization of the nation's finances had brought prosperous conditions.

In 1928 Poland occupied twelfth place among the steel producing nations of the world and stood thirteenth in pig iron output. In that year Poland produced 752,192 tons of pig iron and 1,580,751 tons of steel.

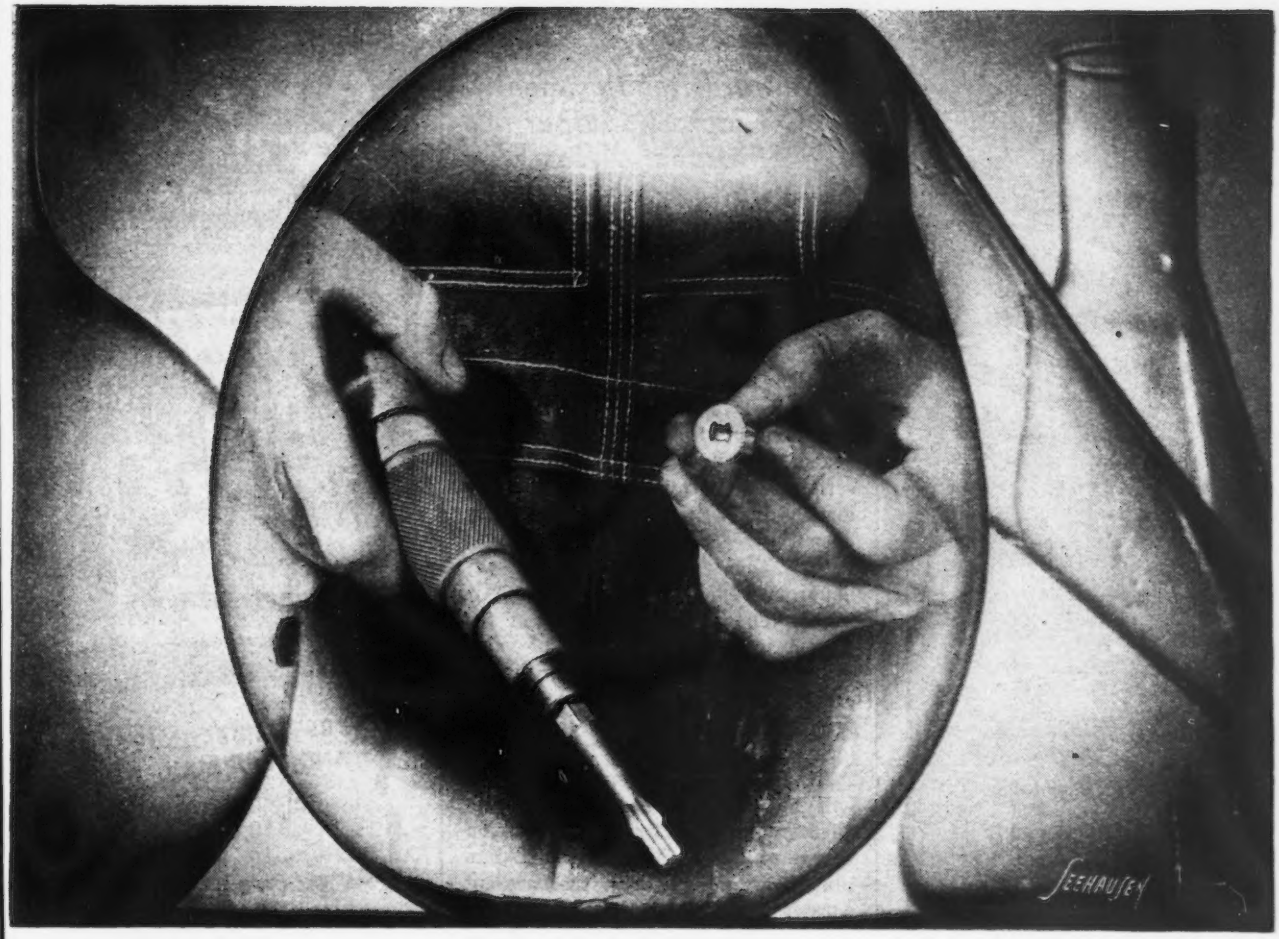
In 1938 the coal and iron mines and the steel plants within the Trans-Olzan area of Silesia became incorporated into Poland. It was estimated at the time that the acquisition would increase Poland's pig iron production by 55 per cent, and her steel output by 50 per cent.

Sharon Buys Stock

Youngstown, Ohio

• • • Sharon Steel Corp. has purchased all the Detroit Seamless Steel Tubes Co.'s outstanding stock, Henry A. Roemer, chairman and president of Sharon Steel, announced recently.

Mr. Roemer said acquisition of the Detroit company is "a further move in the direction of converting Sharon's semi-finished steel into a more widely diversified line of finished products."



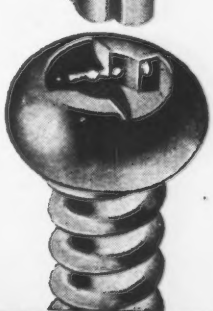
Your Own Assembly Line is the only "test tube" that can correctly measure the outstanding performance of CLUTCH HEAD Screws . . . for the lower cost that comes from smoother, faster and safer driving. Compare these CLUTCH HEAD advantages, *of both screw and driver,* with any other screw on the market:

- ★ Center Pivot insures dead-center entry to prevent canting; makes straight driving automatic.
- ★ Deep positive engagement for definite torque drive, elimination of chewed-up heads, and protection against slippage to damage manpower and materials.
- ★ Square instead of "tapered" engagement disposes of "ride-out" tendency and reduces end pressure fatigue to a minimum.
- ★ The exclusive CLUTCH HEAD Lock-On which unites screw and bit as a unit for easy one-handed reaching and driving.
- ★ The unmatched tool economy of the Type "A" Bit which drives home extra thousands of screws, *uninterruptedly* . . . and which may be repeatedly reconditioned to original efficiency by a 60-second application of the end surface to a grinding wheel.
- ★ CLUTCH HEAD's simplification of field service . . . because it is the *only* modern screw operative with an ordinary type screwdriver.

So that you may get a first-hand understanding of these many advantages, you are invited to send for a package assortment of

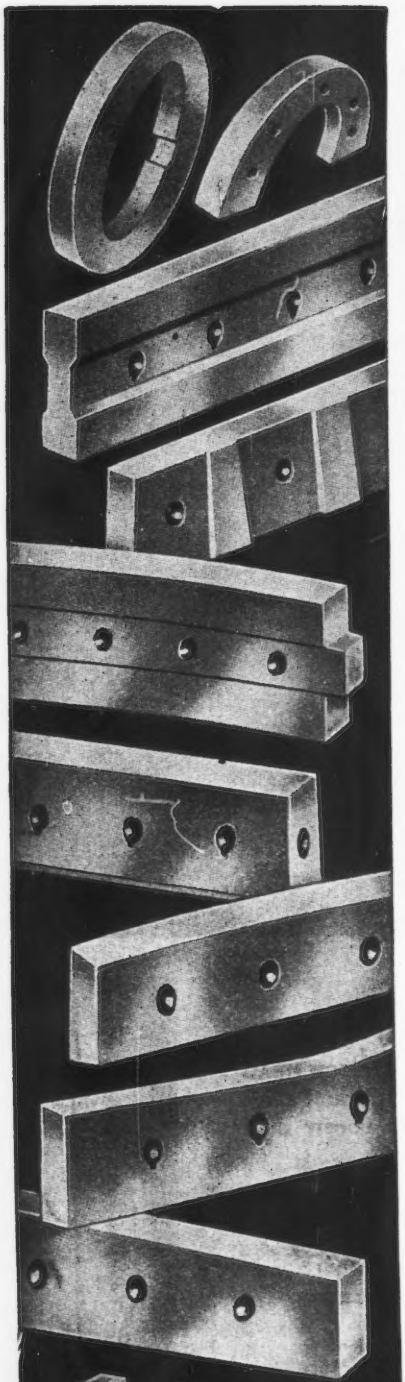
CLUTCH HEAD SCREWS

CLUTCH HEAD *Screws, sample of the Type "A" Bit, and illustrated Brochure. These will be sent you* by mail *and without obligation.*



UNITED SCREW AND BOLT CORPORATION

CHICAGO 8 CLEVELAND 2 NEW YORK 7



Downward Readjustment Of Factory Output In Prospect After War

New York

• • • The index of the value of factory output rose from 302.1 in January to 305.3 in February, according to the Alexander Hamilton Institute. Although the value index in February was lower than in the same month last year when the index was 314.2, it was far above normal as measured by farm income. The index of farm income this year is now estimated at 254.0, or 51.3 points below the index of the value of factory output.

It is thus evident that when the abnormal support of government buying is renewed after the end of the war, a noticeable decline in the value of factory output must occur before even the currently prevailing normal level is reached. The present normal level, however, is highly inflated, suggesting that the postwar normal level will be considerably lower. Consequently, an even greater recession in the value of factory output than that now indicated by the present normal level is eventually in prospect.

It is not likely, however, that a serious deflation of the normal level will occur immediately after the end of the war. When the inflationary support of the government's deficit-spending is curtailed, inflationary support will be afforded by consumers spending their wartime savings. It is possible that this spending by consumers will create for a time even more inflation than that prevailing at present.

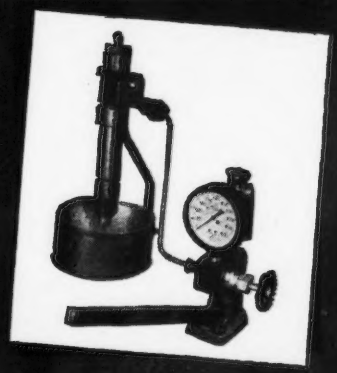
This is particularly true since the government is not likely to be successful in immediately balancing the budget. Strong pressure will be brought to bear on the government for lower taxes while the government's financial assistance will be sought in many directions. Thus, the inflationary support afforded by deficit-spending by the government will not come to a complete halt at once with the ending of the war.

J. L. Young Elected

Pittsburgh

• • • The election of John L. Young, to the newly created post of vice-president in charge of engineering of U. S. Steel's National Tube Co. was announced recently by C. R. Cox, president.

ADECO
NOZZLE TESTER
Keeps Diesel Engines Running Efficiently



TESTS FUEL INJECTORS AND HYDRAULIC DEVICES At Pressures Up To 10,000 p.s.i.

To keep diesel engines operating at peak efficiency, this portable, precision-built Adeco Nozzle Tester is indispensable.

Light in weight yet built for heavy-duty service, it enables any mechanic to make quick, accurate tests on injector opening pressure, spray pattern, etc., and detect stuck needle valves and leakage around valve seats. Tests both large and small injectors, on bench or engine, at pressures up to 10,000 p.s.i. Prevents costly delays and possible damage to engine.

Ideal for testing hydraulic devices.

Write for bulletin on this practical, low-cost unit.

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AIRCRAFT & DIESEL EQUIPMENT CORP.
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Assumes Direction Of Overseas Disposition Of Surplus Property

Washington

• • • **Active direction of** the disposal of Army-Navy overseas surplus property has been assumed by Thomas Bayard McCabe, as commissioner of the Office of Army-Navy Liquidation, a joint military and civilian disposal organization, the office announced recently.

Mr. McCabe is on leave from duty as chairman of the board of the Federal Reserve Bank of Philadelphia and president of the Scott Paper Co. He already has served the government as executive assistant to E. R. Stettinius, Jr., in the advisory commission for the Council of National Defense; deputy director; Division of Priority, Office of Production Management; deputy lend-lease administrator; member of U. S. Committee for Inter-American Development, and chairman of Business Advisory Council for Department of Commerce.

Thomas B. McCabe

Maj. Gen. Donald H. Connolly has been serving and will continue to serve as deputy commissioner. Rear Admiral W. B. Young, formerly chief of the Bureau of Supplies and Accounts of the Navy, is the assistant commissioner.

Upon assuming his new post, Mr. McCabe announced that Livingston Lyman Short of New York has arrived in Italy as field commissioner for the Mediterranean Theatre of Operations. Mr. Short, president of the General Exchange Insurance Corp. and formerly an executive of General Motors Acceptance Corp., has served as lend-lease administrator for F.E.A. in Cairo, Egypt.

Brig. Gen. G. A. Johnson is serving as deputy field commissioner in the Mediterranean area under Mr. Short.

The Office of the Army-Navy Liquidation Commissioner was recently established by order of Secretary of War Stimson and Secretary of Navy Forrestal.

You'll Never Have to Run an Ad Like This as Long as There's

FIBREEN

WANTED

We are in the market for a tough, weather-proof, moisture-proof, dirt-proof wrapping paper. It must assure arrival of shipments at destination in satisfactory condition despite exposure and rough handling. It should eliminate concealed damage and minimize claims. It must be time-tested and proved under the most severe shipping conditions. And, we should be able to buy it at a reasonable price. Address replies to "Any Progressive Manufacturer," U. S. A.

Here are a few of the Main Fibreen Uses

Wrapping for open car shipment . . . lining crates, cases, bags, and cars . . . reduce cases to crates . . . crates to packages . . . wrapping small, large, heavy or light rolls, bales, etc. — for LCL, express, and carload shipments. In addition, use it to protect machinery, parts, and materials stored outdoors.

THE SISALKRAFT CO.
205 W. WACKER DRIVE · CHICAGO 6, ILL.
NEW YORK · SAN FRANCISCO · LONDON · SYDNEY
In Canada Write to Alexander Murray & Co., Limited, at Montreal · Toronto · Halifax · Saint John · Winnipeg · Vancouver

Manufacturers of SISALKRAFT, FIBREEN, SISAL-X, SISALTAPE AND COPPER-ARMORED SISALKRAFT

World's most widely used Dial Scales

• Accurate, rapid, reliable! Whatever your requirements are for weighing, counting, weight-recording, batching, force-measuring... *Look to Toledo!* Toledo Scale Co., Toledo 12, Ohio.

•

TOLEDO
HEADQUARTERS FOR SCALES

Says That Lend-Lease Aid to France Helped Prosecution of War

Washington

• • • Leo T. Crowley, foreign economic administrator, announced recently that lend-lease and reverse lend-lease agreements between the United States and French Governments have resulted in the sharing of substantial volumes of vital supplies, facilities and services by both nations, and that as a result the prosecution of the war has been materially aided.

French troops equipped with American arms and equipment under lend-lease are participating in the fighting in Europe, and American supplies moving to France from this country are aiding the French to repair and to put into more effective operation ports, rail lines, industries, mines and other facilities, which, when functioning at their potential volume, will help greatly in strengthening the drive against the enemy. Since Jan. 1, 30 ships carrying 242,323 tons of vital war supplies valued at about $40,000,000—exclusive of arms and equipment provided to the French by this country — have left American ports for France, and a shipping program now underway calls for a steadily increasing volume of supply.

The French in turn, under reverse lend-lease up to Jan. 31, 1945, had supplied or placed contracts to supply to the United States forces material and services valued at more than $200,000,000, exclusive of reciprocal aid furnished by the French to the United Kingdom and Canada.

The French Empire has also contributed to the war effort through reciprocal aid. In addition to having paid the United States in cash more than $153,000,000 for civilian supplies shipped to them from this country, French North and West Africa through December 31, 1944, supplied the U. S. armies on reverse lend-lease, without payment by the United States, engineer, medical, ordnance, signal, transportation and other services valued at more than $62,000,000.

This volume of reciprocal aid rendered by the French is expected to increase as the flow of war production, raw materials and other vital supplies to France increases and the operation of French factories, mines, farms and other facilities is gradually restored.

Inventory of Washing Machines Drops in '44

Chicago

• • • Inventory of finished washing and ironing machines, materials, and parts in process valued at 620,000 is revealed in the 1944 annual report of Electric Household Utilities Corp., manufacturers of Thor appliances.

"Since War Production Board restrictions forbid civilian sales of washers and ironers, this inventory must be considered non-current until restrictions are lifted," the report states. The previous year such inventories were listed at $1,069,774, reductions having been made through shipments of washing machines and parts to the armed forces. However, the company considers, for accounting purposes, that such inventories may not be realized upon within one year. The firm has supplied the armed forces with 95 per cent of their washing machine requirements, the report states.

Increasing the Life And Accuracy Of Lamination Dies

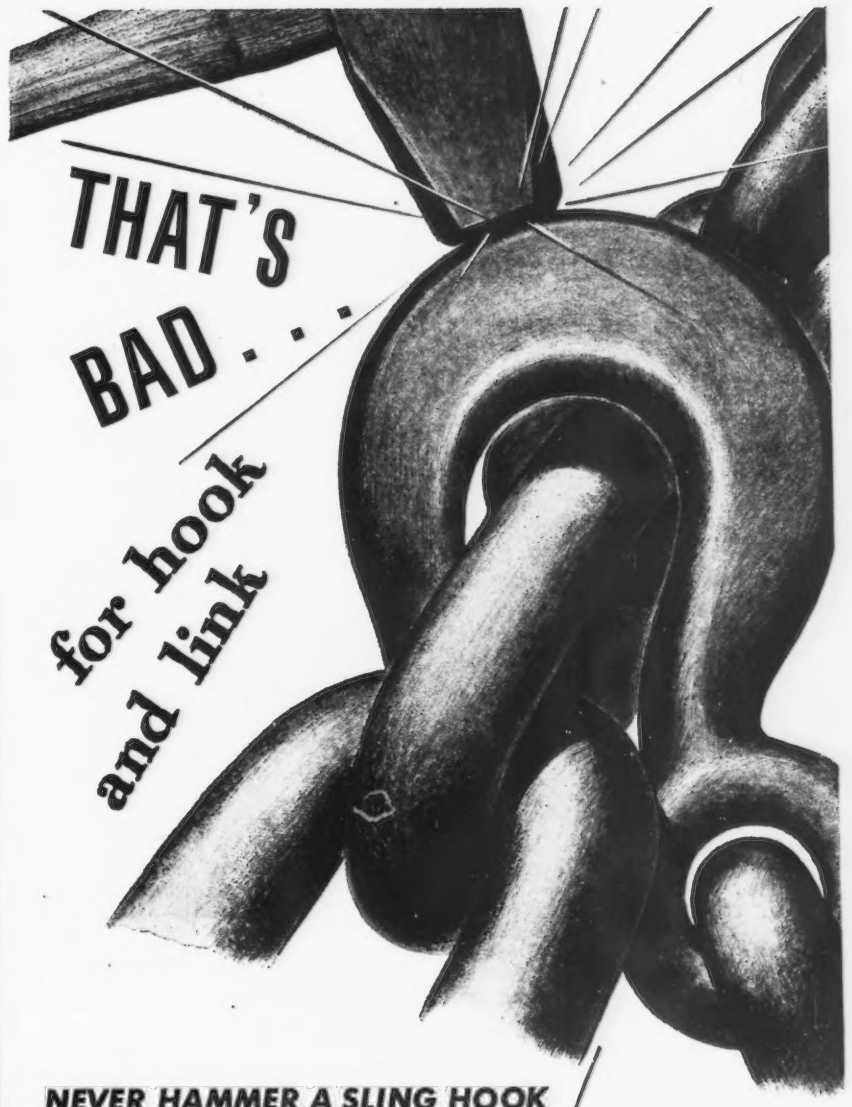
(CONTINUED FROM PAGE 54)

dies, but also an excellent average record.

Die life is predicated in the majority of cases on the thickness of die sections of 1.250 in. This thickness can now be almost entirely utilized. As the section is ground and the thickness is reduced, the induced stresses due to compression and impact become greater and greater until the section fails. The thickness at which failure occurs depends on the simplicity or complexity of the shape of the lamination.

There have been cases where failure occurred at 0.046 in. and other cases where this figure has been greatly exceeded. In some instances the die never failed but was ground down so thin that the threads in the screw holes became insufficient to hold the die plate in the shoe.

Since maximum production is a function of the utilization of die life and since maximum economy is a function of maximum production, the importance of die life is obvious. Therefore, the aim of die engineering is to develop designs which integrate all factors affecting die life. One outstanding die produced 41,000,000 pieces on a die life of only 1.095 in., that is, that had been reduced to this dimension by that time.



NEVER HAMMER A SLING HOOK INTO PLACE! *That's the sum total of this story, except the reasons, which are:* ***You may break the hook immediately. Worse, you may damage hook or link or both internally with little evidence of the injury visible. That condition may lead to an unexpected breakdown in mid-air.*** *Pass on to your workers the simple rules for chain safety. You'll largely eliminate chain failure and consequent casualties, losses and delays.*

USE WELDLESS CHAINS

Weldless Chain is being substituted successfully in many applications, for welded chain and manila rope. We have at present open equipment for manufacturing the following weldless chains and attachments: **Tenso,** *some sizes, steel;* **Lock-link,** *some sizes, steel;* **Jack,** *all sizes, brass and steel;* **American pattern,** *all sizes, steel;* **Register,** *all sizes, brass and steel;* **Safety,** *some sizes, brass and steel;* **Sash,** *all sizes, steel and bronze;* **Attachments,** *a full line of "S" hooks, swivel snaps, rings and special forms.*

Orders should be accompanied by highest possible preference ratings. Write us about your chain and rope problems.

ACCO

York, Pa., Boston, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland, Bridgeport, Conn.

AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

MACHINE TOOLS

. . . News and Market Activities

Tool Sales Impending Drawing Attention of Surplus Property Hearings

Cleveland

• • • A recent announcement of five used machine tool sales and the opportunity to buy some brand new surplus machine tools, scheduled for May, by the Reconstruction Finance Corp., are of timely interest to machinery dealers and the machine tool builders alike.

Two of the sales, one at Springfield, Ill., and the other at Indianapolis Ind., are being pushed on a nation-wide marketing basis — the other three are relatively small and buyers can obtain information from any of the RFC's field offices.

At Springfield, the offering consists of 6617 machine tools and 1155 miscellaneous pieces costing $3,462,000. This is all new machinery, never used, and still in original crates. It may be inspected through May 7 at the AAF depot state fairgrounds, Springfield. OPA ceiling prices will apply.

It is interesting to note that this sale was mentioned in the testimony of Walter E. Joyce, assistant director, Surplus Property Division, RFC, before the Senate Subcommittee on Surplus War Property last week in Washington.

Speaking of the sale, Mr. Joyce said, "This equipment was presented to our inter-agency Machine Tool Committee, screened, and about 6000 pieces of it were re-siphoned from it and put back into the war effort.

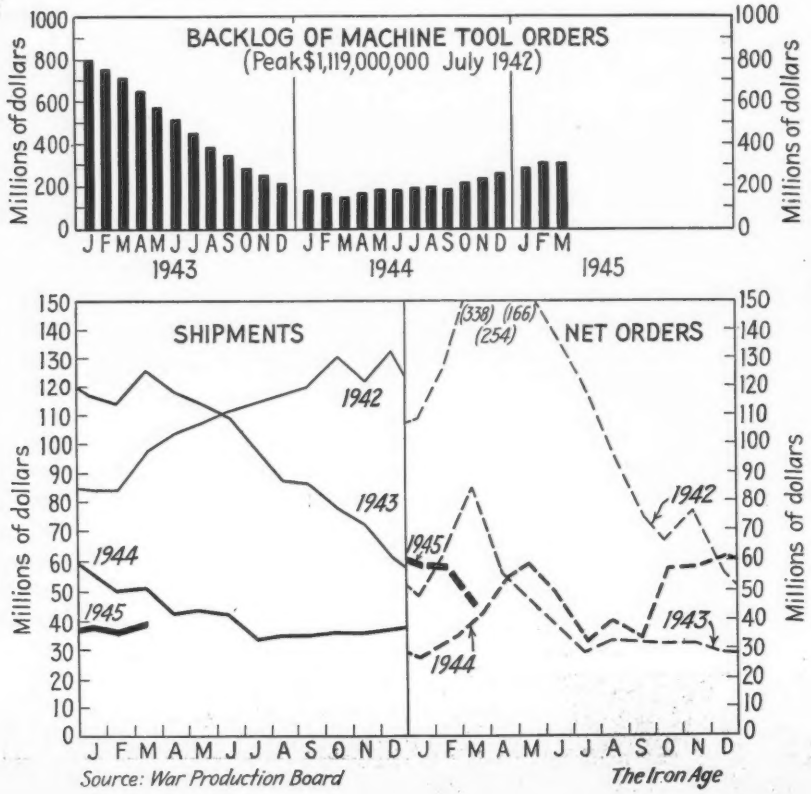
The largest offering af used machine tools under RFC auspices will be made at Indianapolis, Ind., consisting of 1200 second-hand machine tools and other production equipment and property put on sale may be inspected from May 7 through May 12 at RFC warehouse No. 1, General Motors Corp., Allison plant, in Indianapolis. RFC will accept offers beginning May 16. This offering consists of 500 old tools made before 1936 and 700 used tools (which some dealers would like to get their hands on) which are in good condition. Sale of the old tools at current market prices will be made by the sealed bid method with a public opening. Sale of the used tools in good condition will be made in accordance with Surplus Property Board formula prices and by informal bid and offer.

Other sales, each in a relatively small amount, are planned at Eddystone and Meadeville, Pa., Wilmington, Del., and at Charleston, S. C. The Charleston sale is being handled by the RFC agency at Charlotte.

Pertinent to the role machinery dealers can play in surplus machine tool disposal, the remarks of William P. Kirk, vice-president and sales manager, machinery department, Pratt & Whitney Division, Niles-Bement-Pond Co., coming after those of Mr. Joyce, before the same subcommittee, constitute an interesting commentary on the need for utilizing all available sources.

Mr. Kirk, who is chairman of the postwar policy committee of the National Machine Tool Builders Association, told the committee that one of the important channels for disposing of surplus machine tools would be through used machinery dealers who have long engaged in buying and selling used machinery and will serve to find the customer and type and make of machine he wants and to select those best suited to his condition.

• March shipments of machine tools were valued at $39,374,000, an increase of 9.3 per cent over the $36,018,000 total in February, according to a preliminary report issued by the WPB Tools Division. The figures are based on reports received from 198 companies. The value of net new orders decreased $11,323,000 or 19.5 per cent to $46,701,000. The total value of orders received in March amounted to $52,536,000 as compared with $61,823,000 in February. March cancellations were valued at $5,835,000. Unfilled orders remaining on the books at the end of March increased 2.3 per cent over February to $309,650,000, of which $89,967,000 were unrated.



The JIGMIL has proven to be a totally new approach to the problems of economical precision BORING and milling of tool and production work

THE fastest producing and most accurate machine in the field.

Many users are reporting consistent experience of two to three times the output and higher quality work.

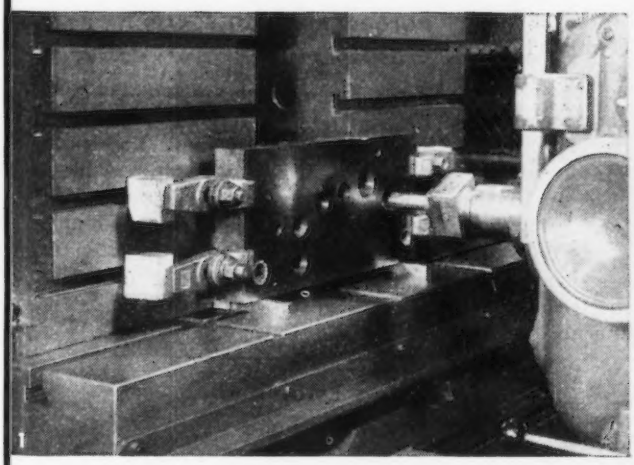
Automatic positioning of spindle from one location to another in response to measuring rods and push buttons to within less than .0001 (one ten-thousandth part of an inch).

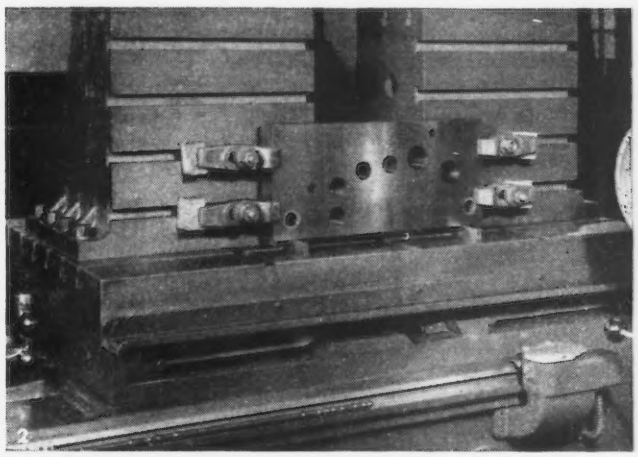
Feather touch, pressure controlled slide locks that positively control locking uniformity, so essential to high precision work.

Unique operation and controls that make possible high precision work with relatively little skill.

★ ★ ★

JIGMIL—The world's finest BORING and milling machine is made in Detroit.





★ **No. 1—Illustration showing convenience of jig plate boring. No. 2—Eight holes precision bored. Holes spaced within .0001 with total dependence of all spacing on automatic positioning means.**

DeVLIEG MACHINE COMPANY DEVLIEG JIGMIL **450 FAIR AVE. FERNDALE 20, (Detroit) MICH.**

NON-FERROUS METALS

. . . News and Market Activities

Nickel Oxide Used for Alloying Steel

New York

• • • **Cuban nickel oxide,** a product of the Nicaro Nickel Co., is now being used for the production of nickel alloy steels in order to conserve supplies of refined nickel for the needs of the United Nations. Oxides constitute approximately 10 per cent of April nickel allotments by the WPB Steel Division, and this practice is to be continued as long as the supply of nickel remains tight, officials say. The nickel supply averages 15 million lb. per month, but demand is considerably greater.

The alloying of steel with nickel oxide represents a new departure in metallurgical practice required by the war. Canadian nickel ores, contain precious metals of the palladium group which make it economically desirable to employ electrolytic refining methods.

There is some speculation in the metal industry that the direct alloying of nickel oxides may continue on in postwar markets.

o o o

Zinc Institute Opposes Reciprocal Trade Act

Washington

• • • **Objections to additional tariff** reductions threatened by the bill extending the Reciprocal Trade Act were made by Ernest V. Gent, Secretary of the American Zinc Institute at a hearing before the Ways and Means Committee of the House. He said that zinc products have already suffered severe tariff cuts. The Canadian agreement reduced duties on imported zinc ore and slab zinc by 20 per cent, and the agreement with Mexico brought further cuts totaling 50 per cent of the 1930 rates. The new bill provides for extension for three years and authorizes reductions of 50 per cent below January 1, 1945 levels.

Zinc Import Duties
cents per lb.

	Tariff Act 1930	Canadian Agreement 1939	Mexican Agreement Effective 1945	Proposed Extension of Act
Zinc ores	1.50	1.20	0.75	0.375
Slab zinc and zinc dust ...	1.75	1.40	0.875	0.4375
Sheet zinc	2.00	2.00	1.00	0.50

"It is true," said Mr. Gent, "that the Mexican agreement states that the above zinc rates, thirty days after the termination of the present emergency, are to be restored to the level which still represents a 20 per cent cut from the 1930 rates. But now the State Department requests the power, under the new bill, to reduce by 50 per cent 'any rate of duty, however established, existing on Jan. 1, 1945'." This can only be interpreted to mean that the low rates under the Mexican Agreement will be further reduced by 50 per cent, says Mr. Gent.

The Institute recommendations included limitation of the extension of the Act to a one-year period, no delegation of additional powers to the Executive Branch, or at least provision for review by Congress, mandatory exercise of the escape clauses of the Reciprocal Trade Agreements, and mandatory adjustments in tariff rates when fluctuations in foreign exchange are excessive.

•

Canadian Copper Imports

New York

• • • **It is reported** that negotiations have been completed to make available to this country surplus production of Canadian copper up to the third quarter of the year. However, Canadian producers and Canadian officials will not estimate surplus tonnages at this time. The trend of the war will naturally influence the results received from such an agreement.

•

Cast Brass Solder-Joint Fittings Being Standardized

Washington

• • • **A proposed** simplified practice recommendation for cast brass solder-joint fittings has just been submitted to producers, distributors and users, for acceptance and comment, according to a recent announcement by the Division of Simplified Practice of the National Bureau of Standards.

The proposal contemplates the establishment of a voluntary simplified list of cast brass solder-joint fittings representing the best thought of the industry. Sketches illustrate the 37 types of fittings, various sizes of which are included in the proposed list.

A limited number of mimeographed copies of the proposed recommendation are available through the Division of Simplified Practice, National Bureau of Standards, Washington 25.

•

High Output of Magnesium Castings at Eclipse Foundries

Teterboro, N. J.

• • • **Monthly production** of magnesium castings averages more than 300,000 lb. at the Eclipse-Pioneer Div. of Bendix Aviation Corp. which operates five nonferrous metal casting plants in Teterboro, Hawthorne, Little Falls and North Bergen, N. J. Mechanization of all foundry operations is said to have contributed to high volume production, and the North Bergen foundry, in particular, is regarded as a foremost example of light metal foundry mechanization.

•

Forged Parts for Fuzes

Philadelphia

• • • **The use of brass and aluminum** forgings by the Frankford Arsenal as components of mechanical time fuzes is estimated to have made possible a saving of 50 per cent of the number of man-hours required for machining operations. First used in 1928 for the fuze body or housing in shells, forgings are used to a greater extent in rockets.

Alcoa Establishes Carnegie Fund

Pittsburgh

• • • **Aluminum Co. of America** has made a grant of $200,000 to Carnegie Institute of Technology to establish a professorship of light metals in the Department of Metallurgical Engineering, it was announced this week.

The gift takes Carnegie Tech, another step toward the goal of its endowment fund drive.

Primary Metals

(Cents per lb., unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb.)	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb.)	$1.50 to $1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.9%, dollars per troy oz.	$4.00
Iridium, dollars per troy oz.	$120.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	$156.00 to $158.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	9.00 to 10.00
Aluminum, deoxidizing No. 2, 3, 4	$6.00 to 9.50
Brass Ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.37
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52s, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NONFERROUS SCRAP METAL QUOTATIONS

†*(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)*

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00
Zincy bronze borings	8.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.35[1]
Manganese bronze solids	6.25[2]
Manganese bronze borings	6.50[1]
Manganese bronze borings	5.50[2]

OPA Group 4†

Refinery brass	4.75*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum

Plant scrap, segregated

2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S 25S	5.00
turnings, dry basis	3.00
Low copper alloys 51, 52, 61, 63S solids	7.50
turnings, dry basis	5.75

Plant scrap, mixed

Solids	4.00
Turnings, dry basis	2.50

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	5.00
Pistons, with struts	3.00
Old alloy sheet	5.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 26c. per lb.; 90 to 98% Ni, 26c. per lb contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25⅛
Electrodeposited	18⅞
Rolled, oval, straight	19⅛
Curved	20⅜
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23⅝
Zinc, cast, 99.99, 15 in. or longer	16¼
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 1-9 troy oz., per oz.	58*

Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver cyanide, 100 oz. lots	—.4179
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	33.00
Zinc sulphate, 89 per cent, crystals, bbls., frt. allowed	6.35

*Price based on use of foreign silver.

SCRAP

. . . News and Market Activities

Consumers' Stocks Drop Again in February

New York

• • • **Consumers' stocks of purchased** scrap were practically a million tons less at the end of February than at the end of August last year, it has been revealed by statistics prepared by the Bureau of Mines. Purchased scrap in the hands of consumers on Feb. 28 totaled 2,354,469 long tons. At that time home scrap stocks aggregated 1,308,000 tons, a figure which has not been subject to more than 100,000 tons variation, at least since early in 1944.

Suppliers' and producers' stocks of scrap have increased 112,000 tons since the end of August and total 1,225,817. However, this figure represents a drop of 71,000 tons since the end of January.

Consumers' inventories of pig iron are down now to 1,231,000 tons, representing a decline since last June's high of 1,485,000 lb. Consumption of all materials during February continued at approximately equivalent rates to those in effect throughout 1944. Consumption of purchased scrap was 1,836,000 tons; home scrap 2,733,000 tons; pig iron 4,043,000 tons.

There are a number of price changes evident in the market this week, most of which represent a further decline in the price of turnings. The sentiment in different markets was mixed last week, judging by the reports received, some indicating optimism for a continued stable scrap market and others viewing the future with pessimism.

President Eugene Grace of Bethlehem Steel Co. when disclosing his quarterly financial report replied, when asked about the prospects of the utilization of alloy scrap, that Bethlehem was segregating and using alloy grades, and in fact paying a premium for alloy scrap, with the exception of alloy turnings. Dealers questioned on this subject indicate that for a matter of several years the only scrap which is receiving a premium price in the market is SAE-2500, the 5 per cent nickel steel used for armor plate which can be charged directly into the furnace without any additional alloying agent.

•

PITTSBURGH—Scrap demand is currently holding, but there are indications of bearishness in the turnings markets. While actual breaks in prices of machine-shop and mixed turnings have not occurred, there are evidences of a weakening of prices. Sales were made this week at the top figure, but there were increasing numbers of sales at $13.50. Demand for heavy scrap is consistent in all grades, with all dealers indicating that they could sell more than they can buy. Railroad lists are beginning to show a greater volume of scrap.

•

CINCINNATI—The district market is featureless. Dealers, generally, indicate a steady and strong demand for cast iron and rail, and an oversupply of borings and turnings. Prices, however, remain unchanged, with large purchasing still missing in the market. Consumers accept material against contracts, but no avid desire for broad anticipation of needs is apparent.

•

CHICAGO — Prices for principal open hearth grades remain firm at ceiling with strong upward pressure exerted on blast furnace and less desirable open hearth grades. In some instances, brokers are reported paying higher than quoted prices in order to fill mill orders for blast furnace grades and bundled machine shop turnings. Some machine shop turnings have been purchased for bundling at prices ranging between $10.00 and $11.00. In neither case have mill purchases taken place at the higher levels. The tightness in blast furnace grades is occasioned by a purchase of these grades at $12.50 by a large local mill which for many months has confined its activity to open hearth grades. Weakness is indicated in several railroad specialties and lower prices quoted this week are nominal in absence of purchasers. Deliveries have not yet been received on new orders for West Coast shipyard scrap, although old orders are pretty well cleaned up.

•

DETROIT — Once again automotive lists brought prices well above going market quotations on turnings, the only grades below ceiling at this market, but day-by-day prices were unaffected. In fact, today's feeling is one of weakness on turnings classes, caused in part by alloy heats going off in some mills, thereby eliminating use of turnings bundles. Scattered sales are being made to outside points at prices below local going prices, but as yet have not affected offering quotations. A few electric furnace transactions justify a spread in quotations, rather than the flat ceiling price heretofore quoted.

•

BUFFALO—Despite weakness of machine shop turnings at other centers and intimations that the undertone here was easier, no new sales to consumers have been uncovered below $13. Some trade interests contend that cutbacks are checking the pressure of offerings in this category and counteracting the effect of increased receipts of heavier scrap at mills. With the likelihood of V-E cancellations in the offing, dealers are pushing deliveries on outstanding contracts for all classes of scrap. Augmenting consumers' supplies during the last week were four barges from New York City, with the first scrap shipments of the canal season, and three shiploads from the lakehead, for a total of 17,500 tons of high grade steel making material.

•

BOSTON—Turnings and borings have dropped an additional 50c. a ton, making the total depreciation the past fortnight $1 a ton. Heretofore business was confined mostly to eastern Pennsylvania shipments, but now Pittsburgh mills and others are buying. No large tonnages of heavy scrap are available, but small lot shipments have picked up somewhat and bundled scrap is more active. Generally the market exhibits more life than noted in months.

•

PHILADELPHIA — The peace rumors of Saturday have made mills here proceed with caution so far as scrap purchases are concerned. There have been no new scrap purchases this week and shipments are being made against old orders only. The turnings price quotation of $11.25 to $11.75 is purely nominal since no new orders have been placed this week.

•

NEW YORK—No further price changes have been recorded in this market, although it has been established that short shoveling turnings followed turnings down and are being bought at $10.25. Dealers report that mills continue to take open hearth grades with apparent disregard of the imminent end of the war in Europe. Scrap movement is said to be good and there is no evidence of a desire to curtail deliveries or orders.

•

CLEVELAND — There has been little activity here in the last few days but shipments are picking up. The manpower situation at yards is bad. There is less interest in machine-shop turnings. According to reports, mills are out of the market to the extent that one buyer has announced that he won't buy another pound of scrap until they bury Mussolini. It is reported that brokers are shying away from buying, figuring that they can get it cheaper by the end of the week. Most brokers have orders which will carry them pretty well through May.

•

Plans Tin Can Salvage

Detroit

• • • **The City Council has signed a contract with Vulcan Detinning Co., Sewaren, N. J., calling for deliveries of an estimated 4,000 gross tons of prepared tin cans which the city is expected to collect in the year beginning May 1 at $11.64 per ton. The price is subject to change if the present freight rate of $4.66 per ton, paid by the detinning company, is changed.**

IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4). Where ceiling prices are quoted they do not include brokerage fee or adjusted transportation charges. Asterisks indicate grades selling at ceilings.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	$13.00 to 14.00
Short shov. turn.	15.50 to 16.00
Mixed bor. and turn.	13.00 to 14.00
Cast iron borings	14.50 to 15.00
Hvy. break. cast	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	16.25 to 16.75
Galv. bundles	14.25 to 14.75
Mach. shop turn.	9.00 to 9.50
Short shovel. turn.	12.00 to 12.50
Cast iron borings	12.00 to 12.50
Mix. borings & turn.	12.00 to 12.50
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Rails 3 ft. and under	22.25*
Locomotive tires, cut	22.50 to 23.00
Cut bolsters & side frames	19.75 to 20.25
Angles & Splice bars	22.25*
Standard stl. car axles	23.50 to 24.00
No. 3 steel wheels	22.00 to 22.50
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast.	20.00*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$8.00 to 8.50
Shoveling turn.	9.00 to 9.50
Cast iron borings	8.50 to 9.00
Mixed bor. & turn.	8.00 to 8.50
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast	16.50*
Stove plate	19.00*
Scrap rails	21.50*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	$10.00 to 10.06
Machine shop turn.	8.00 to 8.50
Mixed bor. & turn.	8.00 to 8.50
Cl'n cast, chem. bor.	13.06 to 14.10*
Truck delivery to foundry	
Machinery cast	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	$9.00 to 9.50
Short shov. turn.	11.00 to 11.50
Cast iron borings	10.00 to 10.50
Mixed bor. & turn.	9.00 to 9.50
Low phos. plate	19.32 to 19.82
No. 1 cupola cast	20.00*
Charging box cast	18.00 to 19.00
Hvy. breakable cast	16.50*
Stove plate	18.50 to 19.00
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	$11.25 to 11.75
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	11.25 to 11.75
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle, forge turn	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	$7.00 to 7.50
Hvy. axle turn.	12.00 to 12.50
Locomotive tires, uncut	20.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	23.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	18.50*
No. 1 mach'ery cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	$9.50 to 10.00
Cast iron borings	9.50 to 10.00
Bar crops and plate	19.50*
Structural and plate	19.50*
No. 1 cast	20.00*
Stove plate	17.00
Steel axles	18.00*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50*
Rails 3 ft. & under	21.00*
Cast iron carwheels	16.50 to 17.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	$13.00 to 13.50
Short shovel. turn.	15.00 to 15.50
Cast iron borings	14.00 to 14.50

NEW YORK

Dealers' buying prices per gross ton, on cars

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	8.25
Mixed bor. & turn.	8.25
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Stove plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	13.00
Shoveling turn.	15.00
Cast iron borings	14.00
Mixed bor. & turn.	13.00
No. 1 cupola cast	20.00*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00*
No. 2 bundles	19.50*
Mach. shop turn.	$11.50 to 12.00
Short shovel.	14.00 to 14.50
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	13.00 to 13.50
Mixed bor. & turn.	12.00 to 12.50
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	$15.50 to $16.25
No. 1 hvy. melting	15.50 to 16.25
No. 2 hvy. melting	14.50 to 15.25
No. 2 bales	13.50 to 14.25
No. 3 bales	9.50 to 10.59
Mach. shop turn.	7.00
Elec. furn. 1 ft., und.	15.50 to 17.00
No. 1 cupola cast	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$14.50 to $15.50
No. 2 hvy. melting	13.50 to 14.50
No. 2 bales	12.50 to 13.50
No. 3 bales	9.00 to 10.00
Mach. shop turn.	4.50
No. 1 cupola cast	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	$14.50
No. 1 hvy. melting	14.50*
No. 3 bundles	11.50
Elec. furn. 1 ft., und.	17.00
No. 1 cupola cast	20.00*

Comparison of Prices . .

Advances Over Past Week in Heavy Type; Declines in *Italics*. Prices are F.O.B. Major Basing Points. The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 144-153.

Flat Rolled Steel: (Cents Per Lb.)	May 1, 1945	Apr. 24, 1945	Mar. 27, 1945	May 2, 1944
Hot rolled sheets	2.20	2.20	2.20	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.65	3.65	3.65	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.20	2.20	2.20	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.80	2.80	2.80	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$43.00	$43.00	$43.00	$40.00
Light rails	43.00	43.00	43.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs, rerolling	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp	1.90	1.90	1.90	1.90

Latest steel interim price increase authorized by OPA effective Jan. 11, 1945.

Pig Iron: (Per Gross Ton)	May 1, 1945	Apr. 24, 1945	Mar. 27, 1945	May 2, 1944
No. 2 fdy., Philadelphia	$26.84	$26.84	$26.84	$25.84
No. 2, Valley furnace	25.00	25.00	25.00	24.00
No. 2, Southern, Cin'ti	26.11	26.11	26.11	25.11
No. 2, Birmingham	21.38	21.38	21.38	20.38
No. 2, foundry, Chicago†	25.00	25.00	25.00	24.00
Basic, del'd eastern Pa.	26.34	26.34	26.34	25.34
Basic, Valley furnace	24.50	24.50	24.50	23.50
Malleable, Chicago†	25.00	25.00	25.00	24.00
Malleable, Valley	25.00	25.00	25.00	24.00
L. S. charcoal, Chicago*	42.34	42.34	42.34	37.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡ For carlots at seaboard.
Last pig iron price change authorized by OPA effective Feb. 14, 1945.
* Charcoal price increase retroactive to March 7, on contracts to Feb. 13.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$7.00	$7.00	$7.00	$7.00
Foundry coke, prompt	8.25	8.25	8.25	8.25
Non-Ferrous Metals: (Cents Per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
May 1, 1945	2.25839c. a Lb.	$24.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.25839c. a Lb.	$24.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.25839c. a Lb.	$24.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30329c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1945	2.25839c., Jan. 16	2.21189c., Jan. 2	$24.61, Feb. 20	$23.61, Jan. 2	$19.17	$19.17
1944	2.30837c., Sept. 5	2.21189c., Oct. 5	$23.61	$23.61	19.17	$15.67, Oct. 24
1943	2.25513c.	2.25513c.	23.61	23.61	19.17	19.17
1942	2.26190c.	2.26190c.	23.61	23.61	19.17	19.17
1941	2.43078c.	2.43078c.	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 8
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c. Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Contact **KAYDON** *of Muskegon*

FOR ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER

2
3
The CROSS Shell Lathe Uses KAYDON Precision-Made Bearings
1
A The Cross Spindle uses two KAYDON Roller Bearings and one Ball Bearing.

1 KAYDON Ball Thrust Bearing (4.9213" x 6.8898" x 1.831")

2 KAYDON Roller Thrust Bearings (5.002" x 9.968" x 2.000") with laminated Plastic Cage.

3 KAYDON Radial Roller Bearing (7.0866" x 11.0236" x 2.9134")

THE outstanding productive capacity, ultra-smooth spindle rotation and load absorbing properties of the Cross No. 10 Shell Lathe are due, in part, to the use of KAYDON Engineered Bearings that meet the exacting requirements of this machine.

No other shell lathe is capable of results achieved with the Cross No. 10. KAYDON was entrusted with the design and manufacture of the bearings — matching the unsurpassed skill of Cross designers with "engineered" KAYDON Bearings.

KAYDON specializes in the production of all types and sizes of ball and roller bearings from 4" Bore to 120" O. D. In addition, KAYDON provides atmospheric control in heat-treating as well as flame hardening, precision heat-treating, metallurgical laboratories, microscopy and physical testing.

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Counsel in confidence with KAYDON. Capacity is available for production of all types and sizes of KAYDON Bearings. Look ahead — plan ahead — with KAYDON!

THE KAYDON ENGINEERING CORP.

KAYDON *Types of Standard or Special Bearings:*

Spherical Roller • Taper Roller
Ball Radial • Ball Thrust
Roller Radial • Roller Thrust

MUSKEGON • MICHIGAN

New in Name . . . Old in Experience

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb. unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per 100 lb. under base; primes, 25c. above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price for annealed, bright finish wires, commercial spring wire. (15) Deduct 10c. per 100 lb. for plates not produced to sheared mill or universal mill width and length tolerances.

Basing Point / Product	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.30¢	2.20¢		2.75¢	2.30¢	2.44¢	2.37¢
Cold rolled [1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 gage)	3.65¢	3.65¢	3.65¢		3.65¢	3.65¢	3.65¢	3.65¢	3.75¢	3.65¢		4.20¢		3.89¢	3.82¢
Enameling (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes [2]	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot rolled [3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled [4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester=3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester=3.35¢)					3.05¢	3.31¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.36¢	5.32¢
Electro, box 0.25 lb.	$4.35	$4.35	$4.35												
Electro, box 0.50 lb.	$4.50	$4.50	$4.50						$4.60						
Electro, box 0.75 lb.	$4.65		$4.65						$4.75						
BLACK PLATE															
29 gage [8]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[12]			3.37¢
TERNES, MFG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth=2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel [6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢[13]	2.25¢	2.39¢	
Reinforcing (rail) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢[13]	2.25¢		2.47¢
Cold finished [8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢		(Detroit=2.70¢)			(Toledo=2.80¢)			2.99¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton=2.70¢)					2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES									(Coatesville and Claymont=2.20¢)						
Carbon steel [15]	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢		2.20¢	2.20¢	2.45¢		2.55¢	2.75¢	2.42¢	2.39¢	2.25¢
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢			(Coatesville=3.50¢)						3.95¢	4.15¢		3.70¢	3.59¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem=2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester=3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester=4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester=6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester=8.55¢)								
WIRE [9]															
Bright [14]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester=2.70¢)		(Duluth=2.65¢)			3.10¢			2.92¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire base														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester=3.30¢)					3.70¢			3.52¢
PILING															
Steel Sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

EXCEPTIONS TO PRICE SCHED. NO. 6.

Slabs, per gross ton—Andrews Steel Co. $41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. $41; Phoenix Iron Co. (rerolling) $41, (forging) $47; Granite City Steel $47.50; Kaiser Co. (rerolling) $58.64, (forging) $64.64, f.o.b. Los Angeles.

Blooms, per gross ton—Phoenix Iron Co. (rerolling) $41; (forging) $47; Pgh. Steel Co. (rerolling) $38.25, (forging) $44.25; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth; Kaiser Co. (rerolling) $58.64, (forging) $64.64, (shell steel) $74.64 f.o.b. Los Angeles.

Sheet Bar, per gross ton—Empire Sheet & Tin Plate Co. $39 mill; Wheeling Steel Corp. $38 Portsmouth, Ohio.

Billets, Forging, per gross ton—Andrews Steel Co. $50 basing pts.; Follansbee Steel Corp. $49.50 Toronto, Ohio; Phoenix Iron Co. $47 mill; Geneva Steel Co. $64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. $49.50; Kaiser Co. $64.64, (shell steel) $74.64, f.o.b. Los Angeles.

Billets, Rerolling, per gross ton—Continental Steel Corp. may charge Acme Steel in Chicago switching area $34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) $41 mill; Wheeling Steel Corp. 4 in. sq. or larger $37.75, smaller $39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at $39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. $41 mill; Continen-

PRICES

tal Steel Corp. (1¾ x 1¾) $39.50, (2 x 2) $40.60 Kokomo, Ind. (these prices include $1 size extra); Keystone Steel & Wire Co. $36.40 Peoria; Connors Steel Co. $50.60 Birmingham; Ford Motor Co. $34 Dearborn, Mich.; Geneva Steel Co. $58.64 f.o.b. Pacific Coast; Pgh. Steel Co. $43.50; Kaiser Co. $58.64 f.o.b. Los Angeles.

Structural Shapes—Phoenix Iron Co. 2.35c. basing pts. (export) 2.50c. Phoenixville; Knoxville Iron Co. 2.30c. basing points; Kaiser Co. 3.20c. f.o.b. Los Angeles.

Rails, per gross ton—Sweet Steel Co. (rail steel) $50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron Corp., $45 Pueblo.

Hot Rolled Plate—Granite City Steel Co. 2.65c. mill; Knoxville Iron Co. 2.25c. basing pts.; Kaiser Co. and Geneva Steel Co. 3.20c. Pacific Ports; Central Iron and Steel Co. 2.50c. basing points; Granite City Steel Co. 2.35c. Granite City.

Merchant Bars—W. Ames Co., 10 tons and over, 2.85c. mill; Eckels-Nye Steel Corp. 2.50c. basing pts. (rail steel) 2.40c.; Phoenix Iron Co. 2.40c. basing pts.; Sweet Steel Co. (rail steel) 2.33c. mill; Joslyn Mfg. & Supply Co., 2.35c. Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar), 2.35c. Chicago; Knoxville Iron Co., 2.30c. basing pts.; Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill.; Milton Mfg. Co., 2.75c. f.o.b. Milton, Pa.

Pipe Skelp—Wheeling Steel Corp., Benwood, 2.05c.

Reinforcing Bars—W. Ames & Co., 10 tons and over, 2.85c. mill; Sweet Steel Co. (rail steel), 2.33c. mill; Columbia Steel Co., 2.50c. Pacific Ports.

Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New Engand Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Mansfield, Mass., f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants, f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass. f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co., for delivery except Texas and Okla., Chicago base, f.o.b. Fort Worth, Tex.; Connors Steel Co., shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co., 2.30c. Chicago; Knoxville Iron Co., 2.25c. basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel Co., 2.25c. Parkersburg.

Galvanized Sheets—Andrews Steel Co. 3.75c. basing pts.; Parkersburg Iron & Steel Co., 3.85c. Parkersburg; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is 2.45c. per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

Wire Products—Pittsburgh Steel Co., f.o.b. Pittsburgh, per 100 lb., rods, No. 5 to 9/32 in., 2.20c.; rods, heavier than 9/32, 2.35c.; bright wire, 2.725c.; bright nails, 2.90c.; lead and furnace annealed wire, 2.85c.; pot annealed wire, 2.85c.; galvanized barbed wire, 3.90c.; plain staples, 2.55c.; galvanized staples, 2.65c.; bright spring wire, 3.30c.; galvanized spring wire, 3.45c.

Are you tying up too much capital in single-purpose machines?
Are you flexible enough to quickly adapt to changing conditions?
Is your fixed overhead on machine tools too high?

War Production Experience Suggests This Precaution in Making Your Post-war Retooling Investment . . .

Tool up with low-cost, flexible

Delta-Milwaukee Machine Tools

You can maintain volume and quality—with big savings . . .

Above: A typical example of the convenient money-saving applications of Delta-Milwaukee Machine Tools in many plants. In the dry extrusion process of making thermal plastics for decorative and structural shapes, it is a simple matter to incorporate a Delta Cut-Off Machine in the production line, so that the continuous strip material can be cut to proper lengths as it comes from the forming machine.

Delta's modern conception of tool design provides you with a safe, versatile approach to the uncertainties that lie ahead. For many operations it eliminates the delay and heavy capital risk involved in buying costly, cumbersome, special machines of limited usefulness that are slow to build and that may become obsolete with the next change in product design.

Using portable, compact, stock-model Delta components, you can build high-production specific-job machines that are readily convertible when requirements change . . . or you can replace worn units on machines that are approaching obsolescence . . . or you can quickly revise or supplement production-line layouts to get the best sequence of operations for increased man-hour output.

You cut down your fixed investment in machine tools . . . retain more liquid working capital for other post-war needs. Delta's savings in cost, weight, and space are not obtained at the expense of quality. They result from advanced design and from quantity production of standard models.

Save money — stay adaptable. Let low-cost Delta-Milwaukee Machine Tools and the ingenuity of your engineers form a workable combination to solve many of your production problems.

DELTA MILWAUKEE Machine Tools

Delta's 76-page Blue Book provides 140 case histories of valuable war production experience that may suggest similar money-saving peacetime applications in your plant. Also available is a catalog of low-cost Delta-Milwaukee Machine Tools. Request both, using coupon below.

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Please send me my free copies of Delta's 76-page Blue Book and catalog of low-cost machine tools.

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Position.....

Company.....

Address.....

City.....(.....) State.....

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 9442-45 Ann.	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	$3.618	$4.872[6]	$5.168a	$3.922	$4.772	$3.705	$3.666	$3.822	$4.072	$5.966	$7.066	$7.272	$8.322
New York	3.690	4.613[3]	5.160	3.974[6]	4.772	3.868	3.758	3.853	4.103	5.858	6.908	7.103	8.203
Boston	3.844	4.744[9]	5.374[9]	4.106	4.715	4.012	3.912	4.044	4.144	6.162	7.262	7.344	8.394
Baltimore	3.494	4.852	5.044	3.902	4.752	3.694	3.759	3.802	4.052	....	....	....	....
Norfolk	3.871	4.965	5.521	4.165	4.865	4.071	4.002	4.065	4.165	....	....	....	....
Chicago	3.35	4.20	5.381	3.60	4.65[17]	3.65	3.55	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.487	4.337[8]	5.422[4]	3.737	4.787[17]	3.787	3.687	3.637	3.887	5.987	7.087	7.087	8.137
Cleveland	3.45	4.40	5.027[4]	3.60	4.45	3.50	3.588	3.35	3.75	5.956	7.056	6.85	7.90
Buffalo	3.45	4.40	4.904	3.819	4.669	3.73	3.40	3.35	3.75	5.75	6.85	6.85	7.90
Detroit	3.55	4.50	5.154	3.70	4.559[17]	3.709	3.561	3.45	3.80	6.08	7.18	7.159	8.209
Cincinnati	3.525	4.475[3]	4.975[5]	3.675	4.711	3.711	3.591	3.511	4.011	....	....	....	....
St. Louis	3.497	4.347[3]	5.322[4]	3.747	4.931[17]	3.797	3.697	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.45	4.40	4.90	3.60	4.45	3.50	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.61	4.48	5.407[4]	3.86	4.35[17]	3.913[3]	3.813[3]	3.763[3]	4.361	6.09	7.19	7.561	8.711
Omaha	3.965	5.443	5.758[4]	4.215	....	4.265	4.165	4.115	4.43	....	....	....	....
Indianapolis	3.68	3.58	4.718	4.918	3.768	4.88	3.63	3.58	3.98	6.08	7.18	7.18	8.23
Birmingham	3.55	....	4.90	3.70	....	3.65	3.55	3.50	4.43	....	....	....	....
Memphis	4.965[7]	4.68	3.415	4.215	....	4.165	4.065	4.015	4.33	....	....	....	....
New Orleans	4.158*	4.95	5.508	4.308	....	4.258	4.158*	4.108*	4.629	....	....	....	....
Houston	3.863	5.573	6.463[1]	4.313	....	4.35	4.25	3.75	6.373[3]	7.223	8.323	8.323	9.373
Los Angeles	5.10	7.20[3]	6.25[4]	4.95	5.813[15]	5.05	4.65	4.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.65[14]	7.30[4]	6.50[4]	4.50[14]	7.33[17]	4.75[14]	4.35[14]	4.15[14]	5.333	8.304	9.404	9.404	10.454
Seattle	4.75[12]	7.05[4]	6.10[4]	4.25[12]	....	4.85[12]	4.45[12]	4.35[12]	5.783	....	9.404	....	....
Portland	4.75[11]	6.80[4]	5.90[4]	4.75[11]	....	4.85[11]	4.45[11]	4.45[11]	5.533	8.304	9.404	8.304	9.404
Salt Lake City	4.63[17]	....	6.32[18]	5.53[17]	....	5.08[17]	4.98[17]	4.88[17]	5.90	....	....	....	....

National Emergency Steels

MILL EXTRAS

Designation	Basic Open-Hearth		Electric Furnace		Designation	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 8612	0.65¢	$13.00	$1.15	$23.00	NE 9427	0.75¢	$15.00	$1.25	$25.00
NE 8615	0.65	13.00	1.15	23.00	NE 9430	0.75	15.00	1.25	25.00
NE 8617	0.65	13.00	1.15	23.00	NE 9432	0.75	15.00	1.25	25.00
NE 8620	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 8622	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 8625	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 8627	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 8630	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 8632	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 8635	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 8637	0.65	13.00	1.15	23.00					
NE 8640	0.65	13.00	1.15	23.00					
NE 8642	0.65	13.00	1.15	23.00	NE 9722	0.65	13.00	1.15	23.00
NE 8645	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 8647	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 8650	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
					NE 9742	0.65	13.00	1.15	23.00
					NE 9745	0.65	13.00	1.15	23.00
NE 8712	0.70	14.00	1.20	24.00	NE 9747	0.65	13.00	1.15	23.00
NE 8715	0.70	14.00	1.20	24.00	NE 9750	0.65	13.00	1.15	23.00
NE 8717	0.70	14.00	1.20	24.00	NE 9763	0.65	13.00	1.15	23.00
NE 8720	0.70	14.00	1.20	24.00	NE 9768	0.65	13.00	1.15	23.00
NE 8722	0.70	14.00	1.20	24.00					
NE 8725	0.70	14.00	1.20	24.00					
NE 8727	0.70	14.00	1.20	24.00	NE 9830	1.30	26.00	1.80	36.00
NE 8730	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00
NE 8732	0.70	14.00	1.20	24.00	NE 9935	1.30	26.00	1.80	36.00
NE 8735	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00
NE 8737	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00
NE 8740	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00
NE 8742	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00
NE 8745	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00
NE 8747	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00
NE 8750	0.70	14.00	1.20	24.00					
					NE 9912	1.20	24.00	1.55	31.00
NE 9415	0.75	15.00	1.25	25.00	NE 9915	1.20	24.00	1.55	31.00
NE 9417	0.75	15.00	1.25	25.00	NE 9917	1.20	24.00	1.55	31.00
NE 9420	0.75	15.00	1.25	25.00	NE 9920	1.20	24.00	1.55	31.00
NE 9422	0.75	15.00	1.25	25.00	NE 9922	1.20	24.00	1.55	31.00
NE 9425	0.75	15.00	1.25	25.00	NE 9925	1.20	24.00	1.55	31.00

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. **Note 2:** For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, AISI Steel Products Manual. **Note 3:** When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and $5 per gross ton for billets, blooms and slabs. **Note 4:** The extras shown are in addition to the base price of $2.70 for 100 lb. on finished products and $54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(*) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271c. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

Per Gross Ton

Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

PRICES

SEMI-FINISHED STEEL

Ingots, Carbon, Rerolling
Base per gross ton, f.o.b. mill.... $31.00
Exceptions: Phoenix Iron Co. may charge $38.75; Kaiser Co., $43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., $34.25; Pgh. Steel Co., $33.10.

Ingots, Carbon, Forging
Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown $36.00
Exceptions: Phoenix Iron Co. may charge $43.00; Empire Sheet & Tinplate Co., $39.25, f.o.b. Mansfield, Ohio; West Coast producers, $48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., $38.10.

Ingots, Alloy
Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh $45.00
Exceptions: C/L delivered Detroit add $2.00; delivered East Michigan add $3.00. Connors Steel Co. may charge $45.00 f.o.b. Birmingham.

Billets, Blooms and Slabs
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.00 higher; delivered E. Michigan, $3 higher; f.o.b. Duluth, billets only, $2.00 higher; f.o.b. Pacific ports are $12 higher. Provo, $11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

Alloy Billets, Blooms, Slabs
Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem. per gross ton $54.00
Price delivered Detroit $2.00 higher; East Michigan, $3.00 higher.

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.
Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.
Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.
Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars
Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp
Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods
(*No. 5 to 9/32 in.*)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(*f.o.b. Pittsburgh, Bethlehem, Syracuse*)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

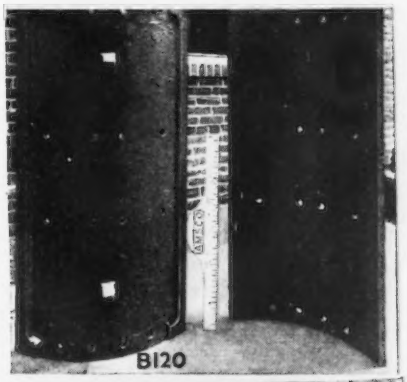
Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

Record Output from Adirondacks Mines Aided by *"The Toughest Steel Known"*

Additional millions of tons of iron ore are being poured into the war machine from the redeveloped, historical Adirondacks area where output has reached an all-time high.

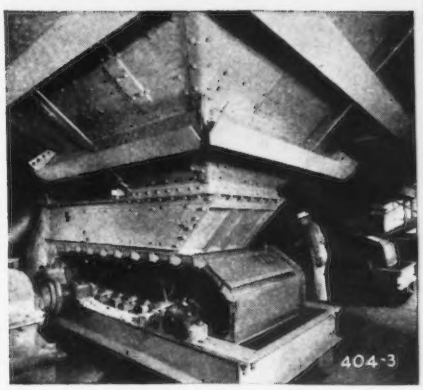
As in all metal mining and processing operations, the equipment used is subjected to stresses and abrasion that tend to destroy it quickly, causing high maintenance expense and production delays. The Adirondacks mines planned for longest equipment life and continuous operation by using austenitic manganese steel wearing parts wherever its application is logical.

Accordingly, such units as slusher hoes, apron feeders, gyratory, jaw and roll crushers, ball and rod mills, hoppers and chutes, and surface-operated power shovels are fitted with "the toughest steel known" wherever it will do the most good. Some of these applications are pictured.

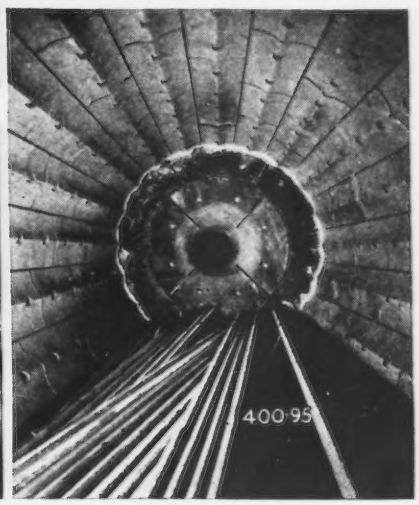


B-120. Back castings for slushers or scrapers, such as those shown in picture 66289, used in underground mines for scraping ore from stopes to cars. The customer stated, "Manganese steel is specified because it is the best metal for resisting the stresses and abrasion in this work."

404-3. Two Stephens-Adamson Amsco apron feeders (Brayton patent) feeding ore to screens from storage bins. Maximum capacity 700 t.p.h. each.



400-95. This Allis-Chalmers 9' x 16' peripheral discharge rod mill, now dry grinding in an Adirondacks mine, is equipped with Amsco manganese steel liners.



Amsco "Conservation Welding Rods" described in Bulletin 941-W.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN Brake Shoe COMPANY

PERFORATED METALS

INDUSTRIAL
ORNAMENTAL

ANY METAL ANY PERFORATION

The Harrington & King PERFORATING Co.

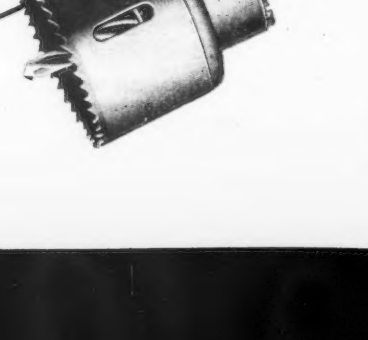
5657 FILLMORE STREET—CHICAGO 44, ILL.
Eastern Office: 114 Liberty Street, New York 6, N. Y.

Fast Tough

Heavy feed at high speed spells doom to the ordinary hack saw blade; down-time for your machine, extra expense in money, man hours, and production. The MARVEL Hack Saw Blade, because it is positively *unbreakable* under these conditions, should be "a must" tool in every efficiently operated shop. A tough alloy steel back is electrically welded to high speed steel teeth, producing a blade that can be pulled to almost unlimited tension; can withstand extra heavy feeds and the heat and abrasion of high speed heavy duty sawing.

Heavy feed at high speed!

The same exclusive *unbreakable* feature of MARVEL Hack Saw Blades is also a feature of MARVEL Hole Saws, giving these saws the ability to stand up under abuse. MARVEL Hole Saws cut holes from 5/8" to 4½" diameter in stock up to 1⅛" thick. Usable in portable drill, drill press, or lathe tail stock.



(HIGH-SPEED-EDGE) MARVEL ARMSTRONG-BLUM MFG. Co. CHICAGO U.S.A.

Complete Range of Metal Sawing Machines

Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

ARMSTRONG-BLUM MFG. CO.
5700 W. Bloomingdale Ave., Chicago 39, Illinois, U.S.A.

PRICES

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh Distric and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe) Base Price—$200.00 per Net Ton

	Black	Galv
Steel (Butt Weld)		
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½
Wrought Iron (Butt Weld)		
½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18
Steel (Lap Weld)		
2 in.	61	49½
2½ in. and 3 in.	64	52½
3½ to 6 in.	66	54½
Wrought Iron (Lap Weld)		
2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17
Steel (Butt, extra strong, plain ends)		
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57
Wrought Iron (Same as Above)		
½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½
Steel (Lap, extra strong, plain ends)		
2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56
Wrought Iron (Same as Above)		
2 in.	33½	15½
2½ to 4 in.	39	23½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pip jobbers are granted a discount of 5%. O less-than-carload shipments prices ar determined by adding 25 and 30% an the carload freight rate to the base card

F.o.b. Gary prices are two points lowe discount or $4 a ton higher than Pitts burgh or Lorain on lap weld and on point lower discount, or $2 a ton highe on all butt weld.

CAST IRON WATER PIPE

	Per Net To
6-in. and larger, del'd Chicago	$54.8
6-in. and larger, del'd New York	52.2
6 in. and larger, Birmingham	46.0
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.4
6-in. and larger f.o.b. cars, Seattle	71.2

Class "A" and gas pipe, $3 extra; 4-in pipe is $3 a ton above 6-in. Prices show are for lots of less than 200 tons. Fo 200 tons or over, 6-in. and larger ar $45 at Birmingham and $53.80 delivere Chicago, $59.40 at San Francisco an Los Angeles, and $70.20 at Seattle. De livered prices do not reflect new 3 pe cent tax on freight rates.

BOILER TUBES

Seamless Steel and Lap Weld Commercia Boiler Tubes and Locomotive Tube Minimum Wall. Net base prices per 10 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless Cold Drawn	*Seamless Hot Rolled*	*Lap Weld Hot Rolle*
2 in. o.d. 13 B.W.G.	15.03	13.04	12.3
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.5
3 in. o.d. 12 B.W.G.	22.48	19.50	18.3
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.1
4 in. o.d. 10 B.W.G.	35.20	30.54	28.6

(Extras for less carload quantities)

40,000 lb. or ft. and over	Bas
30,000 lb. or ft. to 39,999 lb. or ft.	5
20,000 lb. or ft. to 29,999 lb. or ft.	10
10,000 lb. or ft. to 19,999 lb. or ft.	20
5,000 lb. or ft. to 9,999 lb. or ft.	30
2,000 lb. or ft. to 4,999 lb. or ft.	45
Under 2,000 lb. or ft.	65

PRICES

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	Base per Keg	
Standard wire nails	$2.80	$3.30
Coated nails	2.80	3.30
Cut nails, carloads	3.85	....
	Base per 100 lb.	
Annealed fence wire	$3.05	$3.55
Annealed galv. fence wire	3.40	3.90
	Base Column	
Woven wire fence*	.67	.35
Fence posts, carloads	.69	.86
Single loop bale ties	.59	.84
Galvanized barbed wire**	.70	.80
Twisted barbless wire	.70	....

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
½ in. & smaller x 6 in. & shorter	65½
3/16 & 5/16 in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts *Base discount less keg lots*	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
⅝ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 per cent additional discount.

Stove Bolts	*Consumer*
Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 35c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws	*Consumer Per Cent Off List*
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

		20x14 in.	20x28 in.
8-lb. coating	I.C.	$6.00	$12.00
15-lb. coating	I.C.	7.00	14.00
20-lb. coating	I.C.	7.50	15.00

The "Armstrong System" permits the new higher cutting speeds

The urgencies of war have led to the universal use of greatly increased cutting speeds. Today it is not uncommon to find production machine tools actually operating *many times faster* and with greater efficiency than the "standard" cutting speeds of past generations permitted. What is not generally understood is that a similar step-up is equally practical for ordinary operations on standard tool room lathes, planers and shapers.

With the correct ARMSTRONG TOOL HOLDERS for each operation and modern ARMSTRONG HIGH SPEED, ARMIDE (Carbide-Tipped) and ARMALLOY (Cast-Alloy) Cutters, Bits and Blades you can safely increase both speeds and feeds materially, reducing machining time per operation or piece and substantially raise your output per machine-hour.

With the Armstrong System you can make this change-over to high speed operation at will, for ARMSTRONG TOOL HOLDERS and ARMSTRONG CUTTERS are stocked by the leading industrial tool departments in your locality and can be purchased as needed. Start the "modernizing" program now, write for catalog.

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

309 N. Francisco Ave., Chicago 12, U.S.A.

Eastern Whse. & Sales:
199 Lafayette St., New York 12, N. Y.
Pacific Coast Whse. & Sales Office:
1275 Mission St., San Francisco 3, Calif.

ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms

BASING POINT* BASE PRICES					
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	$25.50	$26.00	$26.50	$27.00	.....
Birdsboro	25.50	26.00	26.50	27.00	$30.50
Birmingham	20.00	21.38	.....	26.00	.....
Buffalo	24.00	25.00	25.50	26.00	30.50
Chicago	24.50	25.00	25.00	25.50	.....
Cleveland	24.50	25.00	25.00	25.50	.....
Detroit	24.50	25.00	25.00	25.50	.....
Duluth	25.00	25.50	25.50	26.00	.....
Erie	24.50	25.00	25.50	26.00	.....
Everett	25.50	26.00	26.50	27.00	.....
Granite City	24.50	25.00	25.00	25.50	.....
Hamilton	24.50	25.00	25.00	.....	.....
Neville Island	24.50	25.00	25.00	25.50	.....
Provo	22.50	23.00	.....	.....	.....
Sharpsville [1]	24.50	25.00	25.00	25.50	.....
Sparrows Point	25.50	26.00	.....	.....	.....
Steelton	25.50	.....	.....	.....	30.50
Swedeland	25.50	26.00	26.50	27.00	.....
Toledo	24.50	25.00	25.00	25.50	.....
Youngstown	24.50	25.00	25.00	25.50	.....

DELIVERED PRICES† (BASE GRADES)							
Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$ .50	$26.00	$26.50	$27.00	$27.50	.....
Boston	Birdsboro-Steelton	4.02	.....	.....	.....	.....	$34.52
Brooklyn	Bethlehem	2.50	28.00	28.50	29.00	29.50	.....
Brooklyn	Birdsboro	2.92	.....	.....	.....	.....	33.42
Canton	Cleveland	1.39	25.89	26.39	26.39	26.89	.....
Canton	Buffalo	3.19	.....	.....	.....	.....	33.69
Cincinnati	Birmingham	4.06	24.06	25.44	.....	.....	.....
Cincinnati	Hamilton	1.11	.....	.....	26.11	.....	.....
Cincinnati	Buffalo	4.40	.....	.....	.....	.....	34.90
Jersey City	Bethlehem	1.53	27.03	27.53	28.03	28.53	.....
Jersey City	Birdsboro	1.94	.....	.....	.....	.....	32.44
Los Angeles	Provo	4.95	27.45	27.95	.....	.....	.....
Los Angeles	Buffalo	15.41	.....	.....	.....	.....	45.91
Mansfield	Cleveland & Toledo	1.94	26.44	26.94	26.94	27.44	.....
Mansfield	Buffalo	3.36	.....	.....	.....	.....	33.86
Philadelphia	Swedeland	.84	26.34	26.84	27.34	27.84	.....
Philadelphia	Birdsboro	1.24	.....	.....	.....	.....	31.74
San Francisco	Provo	4.95	27.45	27.95	.....	.....	.....
San Francisco	Buffalo	15.41	.....	.....	.....	.....	45.91
Seattle	Provo	4.95	27.45	27.95	.....	.....	.....
Seattle	Buffalo	15.41	.....	.....	.....	.....	45.91
St. Louis	Granite City	.50	25.00	25.50	25.50	26.00	.....
St. Louis	Buffalo	7.07	.....	.....	.....	.....	37.57

* Maximum per gross ton, established by OPA February 14, 1945. † Prices do not reflect 3 per cent tax on freight.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10, April 11, 1945, retroactive to March 7, 1945. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

Silvery iron and **bessemer ferrosilicon** up to and including 14.00 per cent silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 per cent, C/L per G.T., f.o.b. Jackon, Ohio—$30.50; f.o.b. Buffalo—$31.75. Add $1.00 per ton for each additional 0.50% Si. Add 50c. per ton for each 0.50% Mn over 1.00%. Add $1.00 per ton for 0.75% or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh	21½ to 23½c.
Copper, reduced, 150 and 200 mesh	20½ to 25½c.
Iron, commercial, 100 and 200 mesh 96 + % Fe	12½ to 15c.
Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots	4c.
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots	63c.
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42c.
Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90c.
Aluminum, 100 and 200 mesh	*23 to 27c.
Antimony, 100 mesh	20.6c.
Cadmium, 100 mesh	$1
Chromium, 150 mesh	$1.03
Lead, 100, 200 & 300 mesh	11½ to 12½c.
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51½c.
Solder powder, 100 mesh	8½c. plus metal
Tin, 100 mesh	58¾c.
Tungsten metal powder, 98%-99%, any quantity, per lb.	$2.60
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	$2.60
Under 100 lb.	$3.00

*Freight allowed east of Mississippi.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$7.00*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.25
Foundry, By-Product	
Chicago, del'd	13.35
Chicago, f.o.b.	12.60
New England, del'd	14.25
Kearny, N. J., f.o.b.	12.65
Philadelphia, del'd	12.88
Buffalo, del'd	13.00
Portsmouth, Ohio, f.o.b.	11.10
Painesville, Ohio, f.o.b.	11.75
Erie, del'd	12.75
Cleveland, del'd	12.80
Cincinnati, del'd	12.85
St. Louis, del'd	13.85
Birmingham, del'd	10.50

*Hand drawn ovens using trucked coal permitted to charge $7.75 per ton plus transportation charges.

PRICES

REFRACTORIES
(F.o.b. Works)

	Per 1000
Fire Clay Brick	
Super-duty brick, St. Louis	$66.55
First quality, Pa., Md., Ky., Mo., Ill.	52.85
First quality, New Jersey	57.70
Sec. quality, Pa., Md., Ky., Mo., Ill.	47.95
Sec. quality, New Jersey	52.55
No. 1 Ohio	44.30
Ground fire clay, net ton	7.80
Silica Brick	
Pennsylvania and Birmingham	$52.85
Chicago District	60.65
Silica cement, net ton (Eastern)	9.25
Chrome Brick	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00
Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00
Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.48
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

RAILS, TRACK SUPPLIES
(F.o.b. Mill)

Standard rails, heavier than 60 lb., No. 1 O.H., gross ton	$43.00
Angle splice bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$43.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plate, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.

CORROSION AND HEAT-RESISTING STEEL
(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	33.50c.	31.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

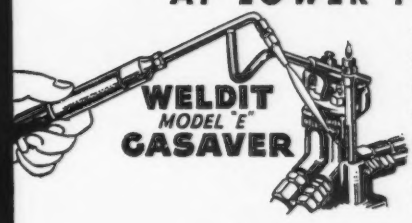
*Includes annealing and pickling.

ELECTRICAL SHEETS
(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

Safe Welding
AT LOWER PRODUCTION COSTS



The Weldit Gasaver shuts off the welding flame when not in use. . . . Conserves essential materials by cutting oxygen and acetylene consumption as much as *fifty* per cent. Prevents injury to workmen—or sudden fires—from dangerous idle torch flames. . . . Adjustment remains unaltered between welds.

When the Weldit Gasaver has been installed, you simply hang idle torch on the handy lever rod. Weight of torch pulls rod down, thus automatically shutting off supply lines. Relight instantly by passing torch over Gasaver pilot light. No bother. . . . No time lost. . . . *No readjusting required.* . . . Price $10.00 at Detroit. Order today.

Better Soldering, Annealing and Heating Jobs

The Weldit Model CW Blowpipe is in daily use by many foremost industrial plants. . . . Built in accordance with the recommendations of leading fabricators of sheet metal products. . . . Operates on either natural gas, manufactured gas, or other low temperature fuel gas and compressed air. Stands up under rough shop use. . . . Send for literature.

WELDIT ACETYLENE CO.
641 BAGLEY AVENUE • DETROIT 26, MICH.

JESSOP
Specialty Steels
WAREHOUSE DELIVERIES

HIGH SPEED TOOL STEEL BITS • BARS-SHEETS-PLATES WATER, AIR AND OIL HARDENING TOOL AND DIE STEELS • CHISEL AND SHOCK RESISTING TOOL STEELS CAST-TO-SHAPE RING DIES • AIRCRAFT SHEETS • DRILL ROD • MALTA CARBIDE TIPPED TOOLS • PRECISION GAUGE STOCK • T AND V CAST ALLOY TOOL HOLDER BITS.

WAREHOUSES:
CHICAGO, ILLINOIS, 1742 Carroll Ave.
CINCINNATI, OHIO, 13 East Second St.
CLEVELAND, OHIO, 1433 Hamilton Ave.
HARTFORD, CONN., 471 Windsor St.
DETROIT, MICHIGAN
Woodbridge & Walker St.
MONTREAL, CANADA
1121 Notre Dame St., West
TORONTO, CANADA
530 Front Street, West

Prompt Mill Deliveries Can be Made of the Following:

Jessop Stainless Steel in all analyses for corrosion resistance, heat resistance and high strength.

Stainless-Clad and Composite Steels.

ARMY NAVY
JESSOP STEEL CO. FINE JESSOP STEELS WASHINGTON PA. EST. 1901

JESSOP STEEL COMPANY
Head Office and Mill: WASHINGTON, PENNA.

REGULATE YOUR AIR POWER

An inspection of air operated presses, riveters, cylinders, or other pneumatic machinery may reveal plenty of places where air power is going to waste through excessive pressures. Full line pressure often can be regulated to provide better operation, and better use of compressor capacity. With a Hannifin Pressure Regulating Valve for each air operated unit, the correct, efficient working pressure is instantly available, automatically maintained. Piston type design allows adjustment over the entire pressure range from 150 lbs. down, gives large volumetric capacity, and sensitive, accurate regulation. In stock for immediate shipment. Write for Regulator Bulletin 56 with full data.

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HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

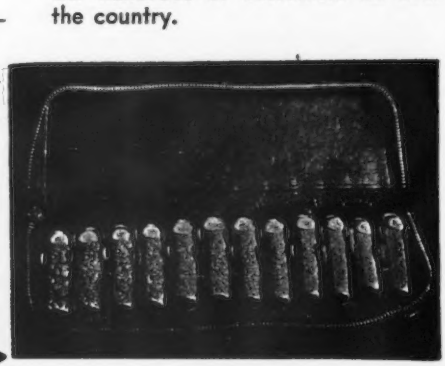
The unprecedented demand for our—

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

Manchester, New Hampshire



HEAT-TREATED STEEL GRIT

PRICES

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale Rockwood, Tenn.

Carload lots (bulk)	$135.00
Carload lots (packed)	141.00
Less ton lots (packed)	148.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	36c.
L.c.l. lots	38c.

95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.

Carload, bulk	34c.
L.c.l. lots	35c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

	Eastern Zone	Central Zone	Western Zone
50% Si	6.65c.	7.10c.	7.25c.
75% Si	8.05c.	8.20c.	8.75c.
80-90% Si.	8.90c.	9.05c.	9.55c.
90-95% Si.	11.05c.	11.20c.	11.65c.

Spot sales add: 45c. per lb. for 50% Si, .3c. per lb. for 75% Si, .25c. per lb. for 80-90% and 90-95% Si.

Silvery Iron

Silvery Iron, Silicon 14.01 to 14.50 per cent, $45.50 per G. T. f.o.b. Jackson, Ohio. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe..	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe..	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk.	3.35c.	3.50c.	3.65c.
2000 lb.-carload	3.8c.	4.2c.	4.35c.

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05c.
2000 lb. to carload	6.70c.
Under 2000 lb.	6.90c.
Briquets, contract, basis carlots, bulk freight allowed, per lb.	5.80c.
2000 lb. to carload	6.30c.
Less ton lots	6.55c.

Ferrochrome

(65-72% Cr, 2% max. Si)

OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C	23.00c.	23.40c.	24.00c.
0.10% C	22.50c.	22.90c.	23.50c.
0.15% C	22.00c.	22.40c.	23.00c.
0.20% C	21.50c.	21.90c.	22.50c.
0.50% C	21.00c.	21.40c.	22.00c.
1.00% C	20.50c.	20.90c.	21.50c.
2.00% C	19.50c.	19.90c.	21.00c.
66-71% Cr, 4-10%	13.00c.	13.40c.	14.00c.
62.66% Cr, 5-7% C	13.50c.	13.90c.	14.50c.

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

	Carloads, Bulk	Ton Lots	Less Ton
0.10% max. C, 1 or 2% max. Si	23.00c.	23.40c.	23.65c.
0.15% max. C, 1 or 2% max. Si	22.00c.	22.40c.	22.65c.
0.30% max. C, 1 or 2% max. Si	21.00c.	21.40c.	21.65c.
0.50% max. C, 1 or 2% max. Si	20.00c.	20.40c.	20.65c.
0.75% max. C, 7.00% max. Si	16.00c.	16.40c.	16.65c.

Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	8.25c.	8.55c.	8.95c.
Ton lots	8.75c.	9.25c.	10.75c.
Less ton lots	9.00c.	9.50c.	11.00c.

Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	6.05c.	6.30c.	6.60c.
Ton lots	6.65c.	7.55c.	8.55c.
Less ton lots	6.80c.	7.80c.	8.80c.

Calcium—Manganese—Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carloads	15.50c.	16.00c.	18.05c.
Ton lots	16.50c.	17.35c.	19.10c.
Less ton lots	17.00c.	17.35c.	19.60c.

Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

	Cast	Turnings	Distilled
Ton lots	$1.80	$2.30	$5.00
Less ton lots	2.30	2.80	5.75

Chromium—Copper

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.

Shot or ingot ..... 45c.

Ferroboron

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	$1.20	$1.2075	$1.229
Less ton lots	1.30	1.3075	1.329

Manganese—Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

	Eastern Zone	Central Zone	Western Zone
11,200 lb. or more	$1.90	$1.9125	$1.9445
Ton lots	2.00	2.09125	2.0445
Less ton lots	2.10	2.1125	2.1445

Other Ferroalloys

Ferrotungsten, Standard grade, lump or ¼X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more $1.90

Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.

Open hearth	$2.70
Crucible	$2.80
Primos	$2.90

Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal $1.50

Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5. Spot sales add 5c. per lb. contained V_2O_5 ..... $1.10

Silcaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)

Carload lots	25c.
2000 lb. to carload	26c.

Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)

Carload lots	58c.
2000 lb. to carload	59c.

Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis

No. 1	87.5c.
No. 6	60c.
No. 79	45c.

Bortram, f.o.b. Niagara Falls

Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.

2000 lb. lots	$2.25
Under 2000 lb. lots	$2.30

Ferrotitanium, 40-45%, 0.10%C. max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti.. $1.33
Less ton lots .. $1.35

Ferrotitanium, 20-25%, 0.10%C. max., ton lots, per lb. contained titanium $1.35
Less ton lots $1.40

High-carbon ferrotitanium, 15%-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload $142.50

Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton $53.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton $75.00

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo. 95c.

Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo. ..... 85c.

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo..... 80c.

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo ..... 80c.

Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add ¼c. for spot sales

Carload lots ..... 14c.

Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy

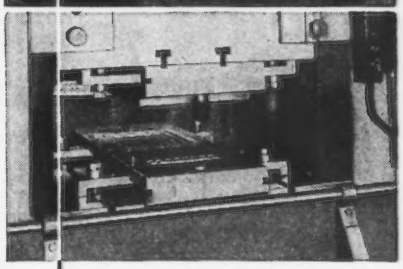
Carload, bulk ..... 4.6c.

Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk ..... 5.75c.
Ton lots ..... 7.25c.

Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.

Car lots	8.00c.
Ton lots	8.75c.
Less ton lots	9.25c.

Drawing and forming refrigerator parts, using Strenes metal dies.



STRENES,

THE ONE DIE METAL THAT NEVER VARIES

Why . . . because there is only one source . . . The Advance Foundry Co., Dayton, Ohio, where Strenes metal is poured by the very experts who originally developed it. Hence it has a uniform metallurgical structure after each and every melt. There are no licensee foundries.

Drawing and forming dies made from "Strenes" cuts machining time 35 to 50% because they are cast to shape, usually to 1/16". They deliver several times the usual number of stampings between redressings.

Used by practically all builders of cars, trucks, tractors, farm implements, refrigerators, stoves, grave vaults, etc. because of these distinct advantages. Names on request. No charge for first (get acquainted) casting if not satisfactory.

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ADVANCE FOUNDRY COMPANY
100 Seminary Ave., Dayton 3, Ohio

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METAL
FOR DRAWING AND FORMING DIES

big sawing

Cutting through a 45" forging of chrome-nickel-molybdenum steel is steady, easy going for this ESPEN-LUCAS Cold Saw Cutting-Off Machine. Extra rigidity, hydraulic control ensure accurate cutting, either up or down. There are over 100 types of ESPEN-LUCAS Cold Saw Cutting-Off Machines for all kinds of metals, all kinds of work. What are your requirements? We shall be glad to recommend the most suitable machines for your particular needs. The Espen-Lucas Machine Works, Front St. & Girard Ave., Philadelphia 23, Pa.

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